

Oct. 14, 1952

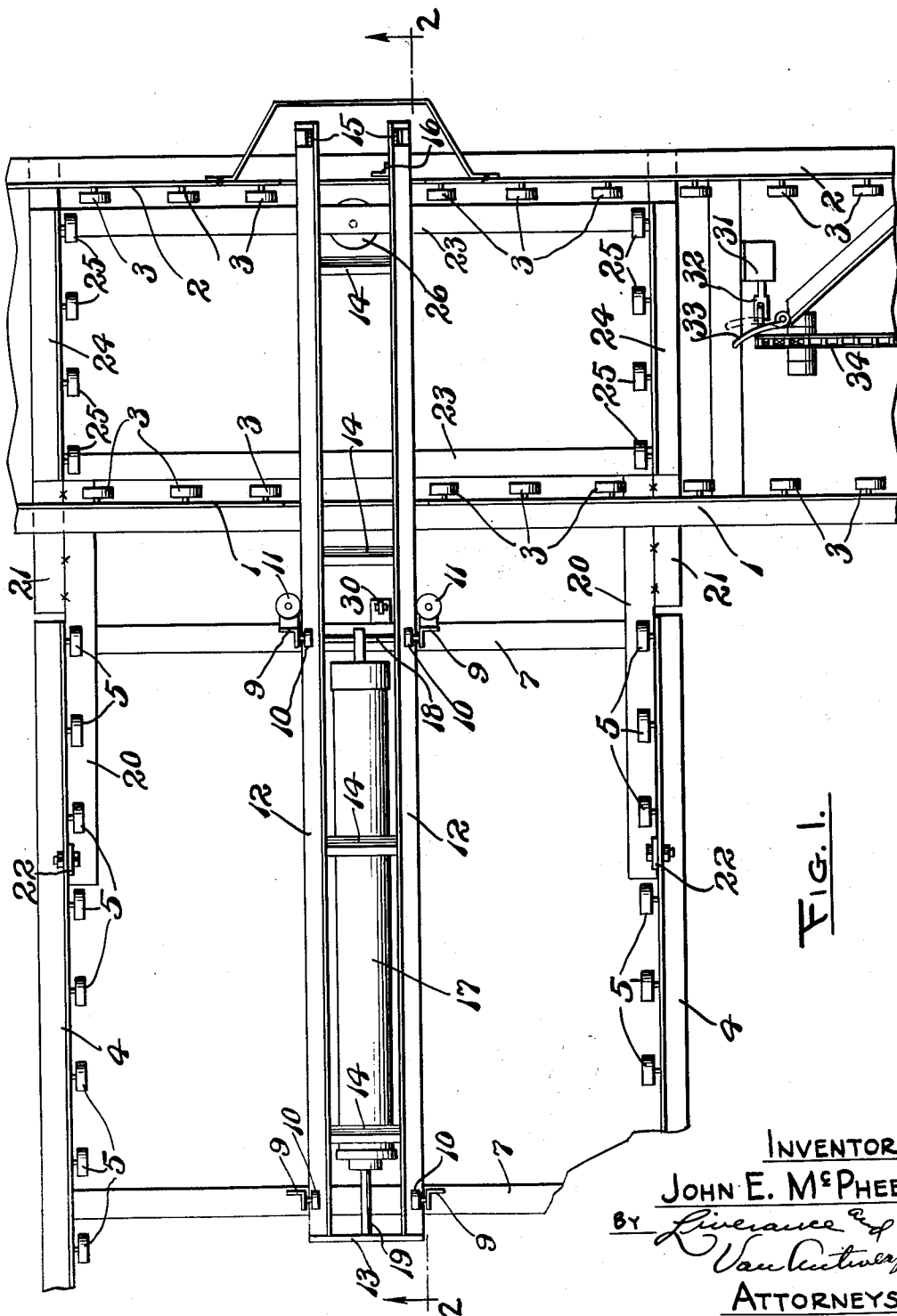
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2,613,798

PALLET CONVEYER AND SELECTOR

Filed July 29, 1950

3 Sheets-Sheet 1



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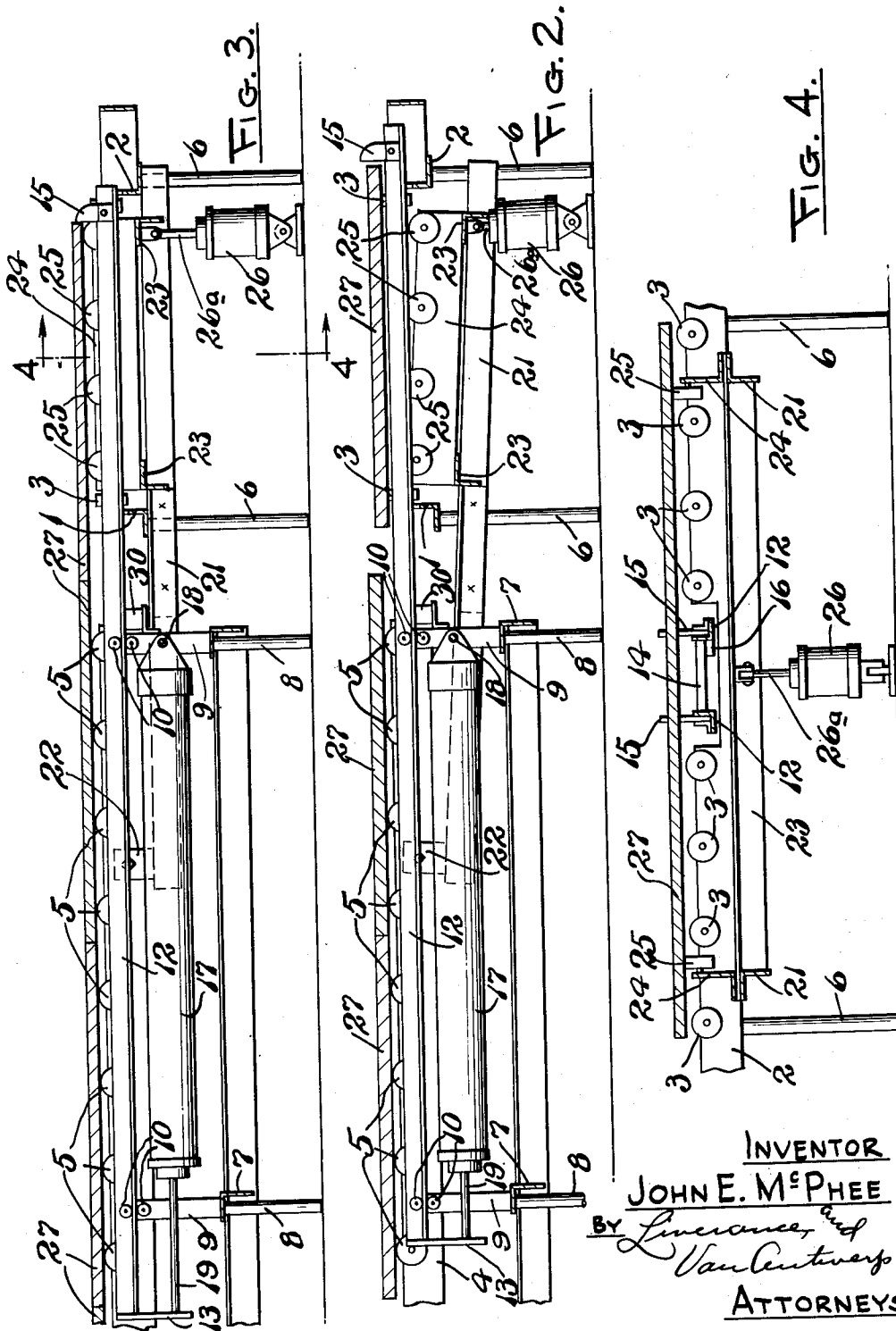
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3 Sheets-Sheet 2



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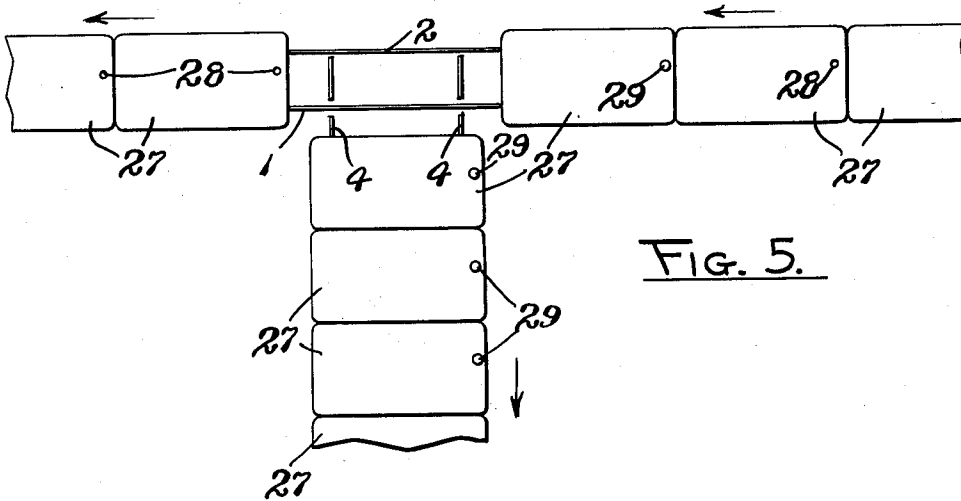


FIG. 5.

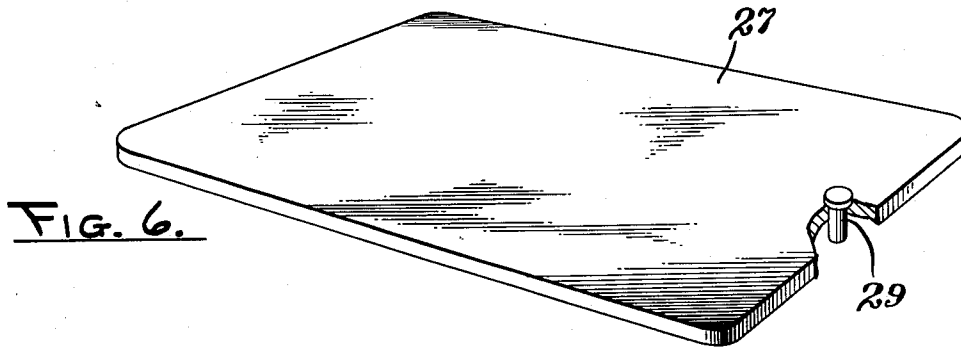


FIG. 6.

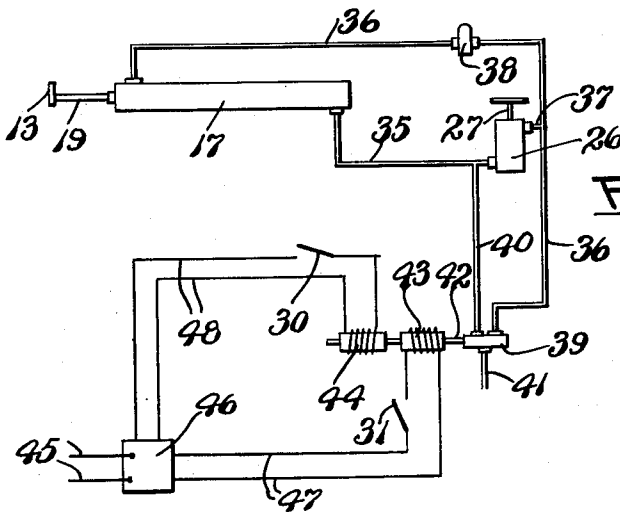


FIG. 7.

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PALLET CONVEYER AND SELECTOR

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Application July 29, 1950, Serial No. 176,725

10 Claims. (Cl. 198—21)

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This invention relates to a pallet conveyor and selecting mechanism, by means of which pallets, on which articles to be processed are held, may be selectively moved either in direct line with their initial movement or selectively moved in a direction at right angles or laterally to their first movement, the pallets being supported on roller track conveying structures, one of which is at right angles to the other. When pallets come to the last mentioned track, they may be selectively moved thereover or continued upon the first track, with respect to which the second track is located at right angles. Thus a continuous series of pallets moving over one track to the juncture with the other or second track, will either continue over the first track or be automatically moved to the second track at right angles thereto, in conjunction with a novel means applied to the pallets which are to be moved at right angles to their first direction of movement, which means is applied to the selected pallets to be thus moved by workmen at a remote distance; while those not having such novel means applied thereto will continue in the same direction of movement which they initially have.

It is an object and purpose of the present invention to provide an automatic conveying and selecting apparatus serving the purposes stated in a particularly effective manner. One place where the novel apparatus of my invention is used is in furniture factories. A pallet carrying articles of furniture over the first roller track structure may be directed to a place in the factory where a finishing process upon the article is to be performed, to a baking oven or for any other purpose. Those which are changed in direction and moved over the second roller conveyor apparatus may require a different or additional processing step, and the pallets which carry such articles have applied thereto the simple and novel means which brings the automatic change direction mechanism into operation, so that such pallets will be selected from a continuous number of pallets carrying such articles of furniture and will be moved or switched to proceed to a different destination.

An understanding of the invention and a preferred structure embodying the same may be had from the following description, taken in connection with the accompanying drawings, in which,

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Fig. 1 is a fragmentary, somewhat enlarged, plan view of the roller conveyor mechanisms, one located at right angles to the other, at the place where a transfer from one to the other takes place.

Fig. 2 is a fragmentary horizontal vertical section substantially on the plane of line 2—2 in Fig. 1 showing the mechanism in one position.

Fig. 3 is a like view showing the mechanism in a second position, in which position the change from one roller conveyor to the other is made.

Fig. 4 is a vertical section substantially on the plane of line 4—4 of Fig. 3, looking in the direction indicated.

Fig. 5 is a plan view illustrating diagrammatically the pallets, part moving in one direction and part in another direction at right angles thereto.

Fig. 6 is a perspective view of the pallet with a portion at one end broken away and shown in section, and

Fig. 7 is a diagram of the fluid pressure and electric circuits for controlling and operating the mechanism.

Like reference characters refer to like parts in the different figures of the drawing.

In the structure shown, one roller conveyor over which pallets may be moved includes parallel spaced apart track bars 1 and 2, preferably of angle iron members, on the vertical legs of which spaced rollers 3 turning on horizontal axes are mounted. A second roller track conveyor includes spaced parallel bars 4, also of angle form, on the vertical legs of which like spaced rollers 5 are mounted, but with the rollers 5 disposed a short distance above the plane of the rollers 3. The bars 4 are spaced farther from each other than the bars 1 and 2, in accordance with the shape of a pallet which is greater in length than it is in width. If the pallet was square the spacing of the bars 1 and 2 and of the bars 4 would be the same. Such bars 1, 2 and 4 are mounted on suitable posts 6 which extend to the floor as shown in Figs. 2 and 3. The ends of the bars 4 which are adjacent the inner bar 1 of the first conveyor structure are spaced therefrom a short distance.

Below and transversely of the bars 4 are spaced horizontal angle bars 7 carried by short posts 8 (Figs. 2 and 3), each of which has two vertical posts 9 of similar angle form permanently se-

cured thereto at their lower ends and extending upwardly. At their upper end portions and at their adjacent sides each carries a pair of spaced rollers 10 the axes of which are in vertical alignment. Other rollers 11 (Fig. 1) are carried by posts 9, as shown in Fig. 1, such rollers 10 and 11 serving as carriers and guides for the spaced side bars 12 of a movable frame which is mounted for a longitudinal movement parallel to the length of the roller carrying bars 4, and located substantially midway between them.

The two bars 12 parallel each other and are of angle form having outwardly extending horizontal legs which are between the rollers 10 while the rollers 11 bear against their outer edges. The bars 12 are tied together at what may be termed their inner ends by a permanently connected plate 13. A plurality of cross bars 14, spaced from each other, are used to connect the frame bars 12, being located at different places intermediate the length of said bars 13. Each bar 12 at its outer end carries an upwardly extending finger 15 (Figs. 2 and 3) permanently secured thereto, and one of them at its inner side and near its outer end has a switch actuating member 16 permanently secured thereto.

A somewhat elongated cylinder 17 is connected at its outer end on a cross rod 18 between the posts 9 nearest the track bar 1, and extends therefrom horizontally toward the plate 13. A piston rod 19 connected to a piston within the cylinder (not shown) passes through the inner end closure of the cylinder 17 and is permanently connected to the plate 13. When the piston rod 19 is moved to the left (Figs. 2 and 3), the carriage frame provided by the bars 12 and the cross members 13 and 14 is moved to the left (Figs. 2 and 3) and when the reverse movement takes place such carriage is moved back to its initial position (Fig. 2), in which it is across the roller carrying bars 1 and 2 and over them with the fingers 15 at the outer side of the outermost bar 2.

A bar 20 is located at the inner side of each of the roller carrying bars 4, at their outer end portions, and extends outwardly beyond the outer ends of the bars 4. Each bar 20 has a permanent welding connection to another bar 21, located at the outer side of the bar 20, and extending underneath the first track bars 1 and 2. At their inner ends, short generally vertical plates 22 are permanently secured and extend upwardly. Near their upper ends they are pivotally connected to the vertical legs of the roller carrying bars 4.

Cross bars 23, spaced from each other and located one in a plane at the inner side of the roller carrying bar 2 and the other at the outer side of the roller carrying bar 1, are permanently connected at their ends to the bars 20 and 21. Over the bars 21 between the roller carrying bars 1 and 2 angle bars 24 are permanently secured, the vertical legs of which carry spaced rollers 25 turning on horizontal axes. The rollers 25 are in direct alignment with the rollers 5. When the frame thus described and which is pivotally mounted by means of the plates 22 is elevated, the rollers 25 are at the same height as the rollers 5 and, therefore, a short distance above the rollers 3. The elevation of the outer end of the frame is by means of a fluid pressure cylinder 26 which has a pivotal mounting at its lower end on a bracket secured to the floor and through the upper end

of which a piston rod 26a passes connected with the outer bar 23. The upward movement of the piston rod 26a (Fig. 4) lifts the outer free end of the described frame to a position in which rollers 25 and 5 are aligned and are at the same height.

The pallets 27 (Figs. 5 and 6) are flat and of a rectangular shape being of a greater length than width. Each pallet at one end has an opening 28 downwardly through it. In such openings pins 29 may be inserted. The pins are headed at their upper ends and the shanks being of a greater length than the thickness of the pallets extend below the lower sides of the pallets with which connected.

On a cross bar carried by the outer post 9 a normally open switch 30 is mounted in a position to be closed by the member 16 when such member is moved thereto. A second switch 31, normally open, is carried on a cross bar between the roller carrying bars 1 and 2 and will be closed by a closure member 32 connected therewith upon swinging movement of a pivotally mounted actuating member 33 in a clockwise direction, when a pallet 27 having a pin 29 connected therewith moves so that such pin bears against the inner side of the member 33 and swings it from its full to its dashed line position shown in Fig. 1.

The pallets (Figs. 5) are carried in the direction indicated by the arrow over the rollers 3 to junction station of the conveyor bars 4 located at right angles thereto, part of such pallets being supplied with pins 29 and others not having such pins connected therewith; any pallet which has a pin 29 connected therewith operates to close the switch 31. The pallets may be moved by an endless chain conveyor 34 (Fig. 1). In those cases where the pin closes the switch 31, there is an automatic operation of a valve to direct fluid pressure to the outer end of the cylinder 17 whereby its piston rod is moved out of the inner end of the cylinder 17 and the carriage comprised of the bars 12 and connecting parts 13 and 14 is moved to the left (Figs 1, 2 and 3).

The control of the movements of the piston rod 19 of cylinder 17 and of the rod 26a of cylinder 26 is shown diagrammatically in Fig. 7. The lower end of the cylinder 26 and the outer end of the cylinder 27 are connected by a pipe conduit 35. The inner end of the cylinder 17 has a pipe conduit 36 connected therewith which, through a branch connection at 37, joins with the upper end of the cylinder 26. In the line of the conduit 36 between the cylinders 17 and 26 an air passage control valve 38 is located which permits free passage of air to the cylinder 17 in such conduit but controls and restricts and slows down or stops passage of air from the cylinder 17 until a predetermined pressure has been accumulated.

The conduit 36 leads to a valve housing 39 having connection thereto. A further conduit 40 for the fluid pressure connects at one end with the valve housing 39, and at the other to the first mentioned conduit 35 at a point between the cylinders 17 and 26. Compressed air or other fluid pressure leads into the housing 39 through a pipe 41.

The valve within the valve housing for controlling the passage of air to and through the pipes 40 and 36 alternately, is through a rod 42 secured on which are two spaced apart armatures 43 and 44 of solenoids, the solenoids

having windings around such armatures. The electric current from electric mains is carried by wires 45 to a junction box 46. The circuit wires 47 therefrom are connected with the winding around the armature 43 and in such circuit the normally open switch 31 is located. Other circuit wires 48 from the junction box have the solenoid winding around armature 44 interposed therein, and in such circuit the switch 31 is located.

When pallets are placed on the rollers 3 and are moved in the direction indicated in Fig. 5 by conveyor chain 34, if such pallets do not have the pins 29 inserted in the openings 28 they will merely continue their movements over the rollers 3 in a direct line. When a pallet carrying a pin 29 reaches a position such that the pin 29 strikes the lever 33 and closes the switch 31 the solenoid having the armature 43 is energized and the valve within the valve housing moved so that the pressure fluid, compressed air or the like, flows through the conduits 40 and 35 and the outer end of the cylinder 17 and lower end of cylinder 26. Air from the inner end of the cylinder 17 will be exhausted through the conduit 36 and from the upper end of the cylinder 26 through the branch conduit 37. The lifting of the rollers 25 will take place immediately but the movement of the piston in the cylinder 17 will be delayed until sufficient pressure has been built up in the exhaust pipe 36 to open the control valve 38 thereby delaying movement of the fingers 15 until the pallet has been lifted after which the bars 12 will move to the left (Fig. 1). The fingers 15 engaging the outer side edges of a pallet 27 will move it over the rollers 25 and 5 and also move any previously switched pallets through the power exerted by the cylinder 17, its piston and piston rod 19. Such movement continues until switch 30 is closed by the member 16 coming thereto. On the closure of the switch 30 the solenoid winding around the armature 44 will be energized and the rod 42 moved in the opposite direction, so as to change the valves to direct fluid pressure through the conduits 36 and 27 to the upper end of cylinder 26 and the inner end of the cylinder 17, returning the parts to initial position in readiness for the next pallet 27 which carries a pin 29.

It is therefore apparent that the one who loads the conveyor in the first instance at a remote distance, by applying to selected pallets the pins 29 will condition them for automatic transfer from the conveyor rollers 3 to the rollers 5, while other pallets from which the pins 29 are absent will continue their movement over the rollers 3. Of course a corner may be turned, for example, at a corner in a room at a factory, and each pallet in such circumstances will require a pin 29 to be attached thereto in order to insure the transfer from the rollers 3 to the rollers 5.

The structure described is very practical and useful and is in continuous operation. It is sturdy and efficient and is not liable to get out of order.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. In a structure as described, a conveyor over which pallets are adapted to be moved with the pallets located in end to end relation, a

second conveyor extending at right angles to and located at a side of the first conveyor over which pallets are adapted to be moved in side by side contacting relationship, a carriage mounted underneath the second conveyor extending across the first conveyor, means for mounting said carriage for reciprocatory movements in the direction of the length of the second conveyor, said carriage having upwardly extending pallet engaging means thereon to engage a side edge of a pallet over the first conveyor, and means for elevating a pallet above said first conveyor and for moving the carriage to bodily move the pallet to the second conveyor.

2. A structure as defined in claim 1, said carriage moving means comprising, a cylinder substantially parallel therewith, a piston rod extending from one end of the cylinder connected with the inner end of the carriage, and means for alternately entering fluid pressure at opposite ends of the cylinder.

3. The elements of claim 1 in which said means for elevating a pallet and for moving the carriage includes means controlled by movement of the carriage to return said elevating means and said carriage to rest positions.

4. In a structure as described, a conveyor comprising two spaced parallel bars, each having spaced rollers thereon turning on horizontal axes, a second conveyor to one side of the first conveyor having spaced parallel bars and rollers thereon spaced from each other mounted to turn on horizontal axes, the rollers on the second bars being at a higher elevation than those on the first bars, a frame pivotally connected to the bars of the second conveyor extending underneath the first conveyor, rollers on said frame between the bars of the first conveyor, said rollers being in alignment with the rollers of the second conveyor, and at the same height when the frame is lifted to upper position, means to move pallets over the rollers of the first conveyor, means for elevating said frame to lift a pallet from the rollers of the first conveyor therewith, and means for engaging a pallet thus lifted at its outer edge to move it to the second conveyor.

5. A structure as defined in claim 4, said means for moving said pallet comprising a carriage mounted for reciprocatory movements back and forth between the bars of the second conveyor, said carriage at its outer end having pallet edge engaging means, whereby when the carriage is moved in one direction said pallet is moved therewith to the second conveyor, and means actuated by a pallet for rendering said frame lifting means and said carriage moving means automatically operative when the pallet is over the rollers on said frame.

6. In a structure as described, a conveyor over which articles are adapted to be moved successively, a second conveyor extending laterally from the first conveyor, a lifter in the path of the first conveyor and in alignment with the second conveyor adapted to elevate articles from the first conveyor, a pusher adapted to move articles from said lifter onto said second conveyor, and automatic means controlled by movement of an article on the first conveyor for actuating said lifter and said pusher.

7. The elements of claim 6 combined with automatic means controlled by movement of said pusher in an article pushing direction acting to return said pusher and lifter to rest positions.

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8. The elements of claim 6 in which said automatic means for actuating said lifter and said pusher acts to elevate said lifter prior to actuation of said pusher.

9. The elements of claim 6 in which said automatic means for actuating said lifter and said pusher includes a cylinder and piston for each of said lifter and pusher, fluid pressure and exhaust conduits for said cylinders and a delayed action valve in one of the conduits for said pusher cylinder.

10. The elements of claim 1 in which said means for elevating a pallet and for moving the

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carriage automatically acts to raise the elevating means prior to moving the carriage.

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