Feb. 16, 1954

R. I. BERRY

CONVEYER

2,669,343

Filed Feb. 10, 1950

3 Sheets-Sheet 1

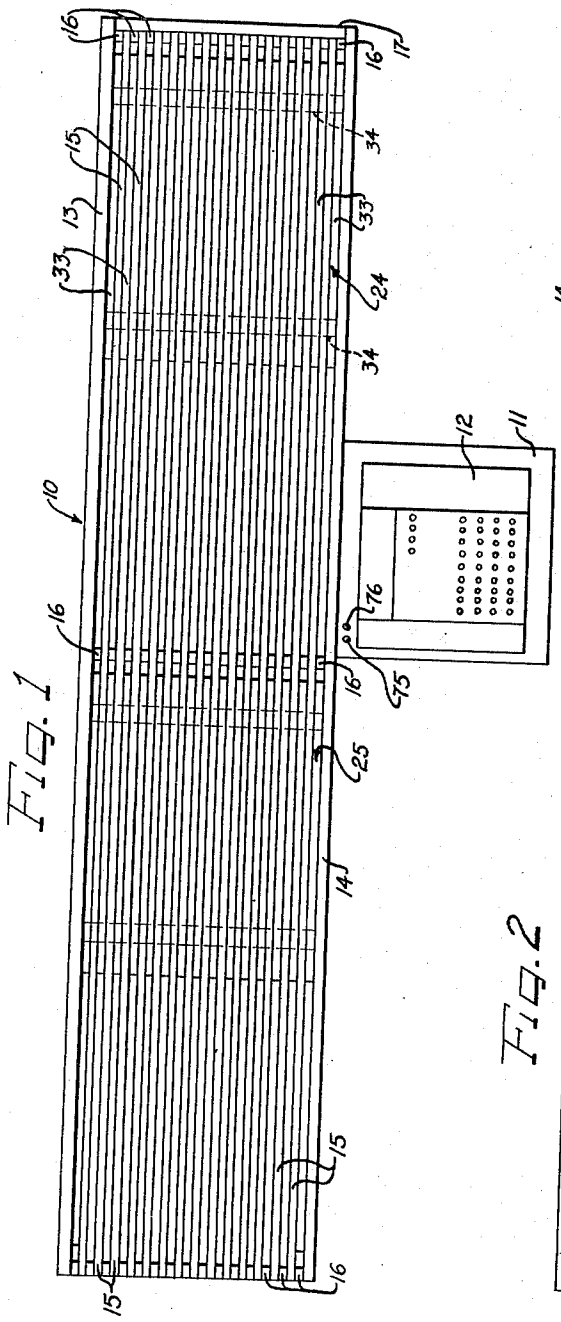


Fig. 1

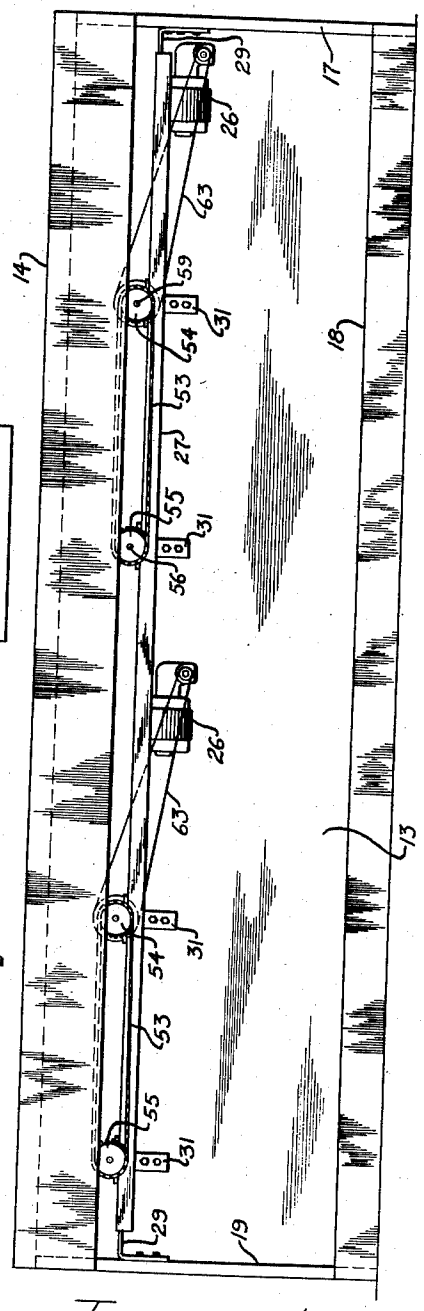


Fig. 2

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CONVEYER

Filed Feb. 10, 1950

3 Sheets-Sheet 2

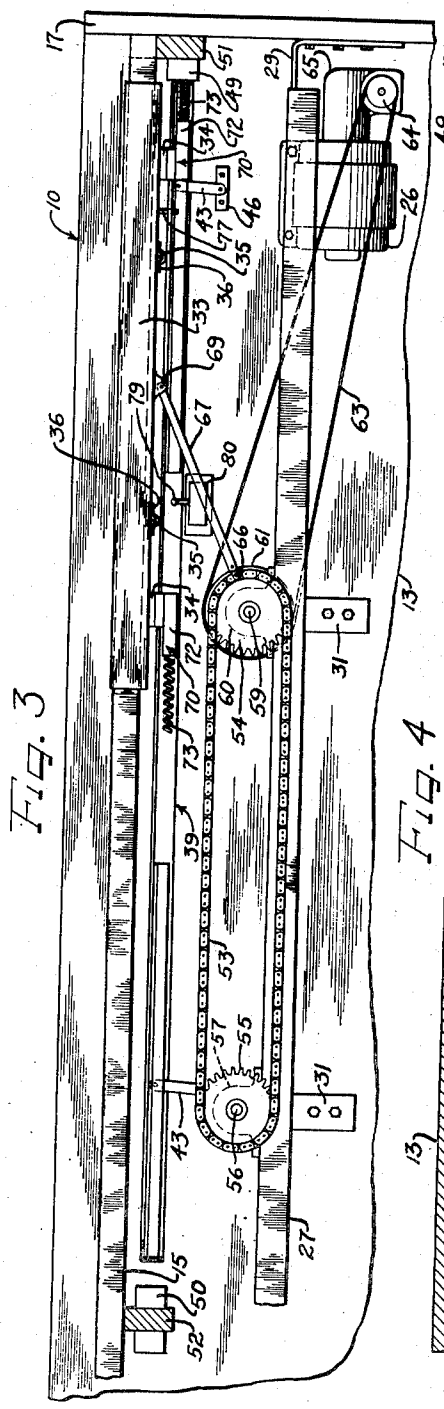


Fig. 3

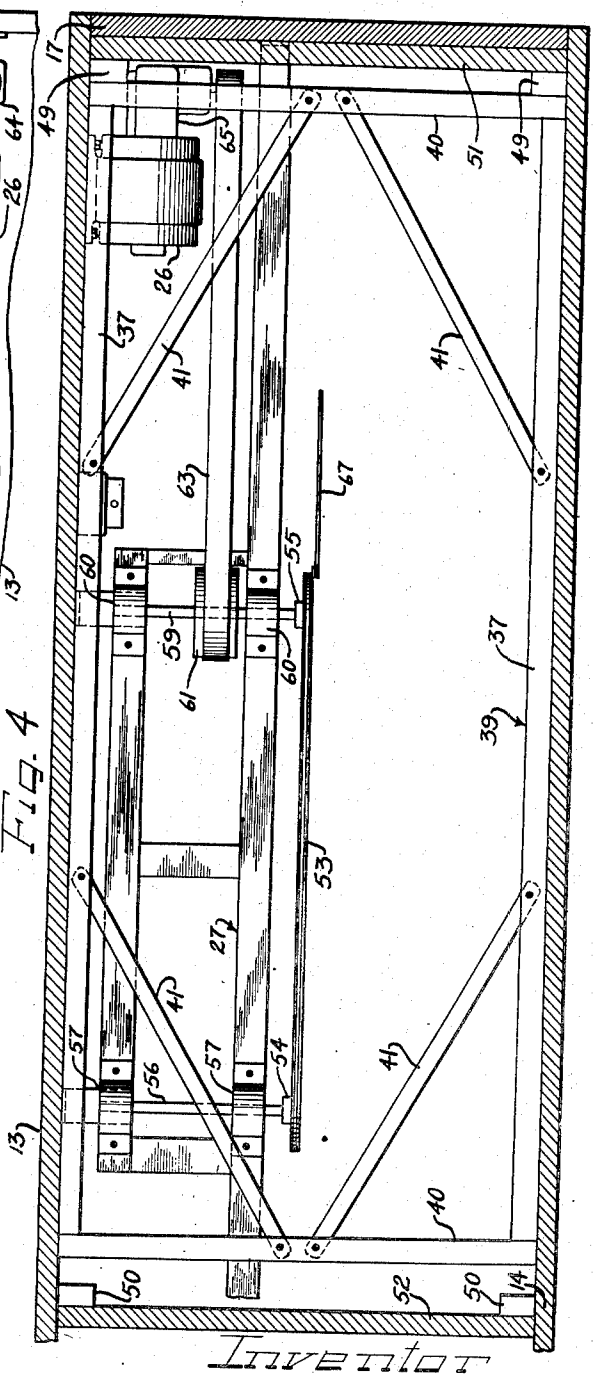


Fig. 4

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Feb. 16, 1954 R. I. BERRY 2,669,343

CONVEYER

Filed Feb. 10, 1950 3 Sheets-Sheet 3

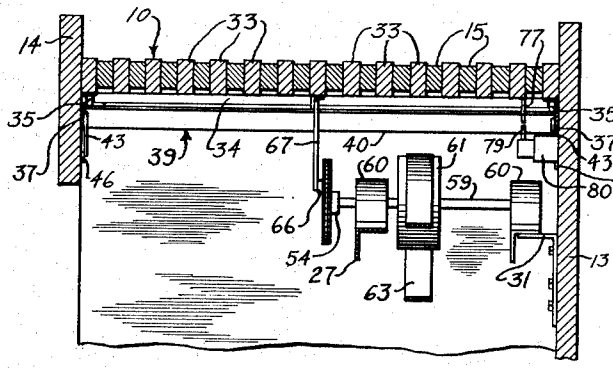


Fig. 5

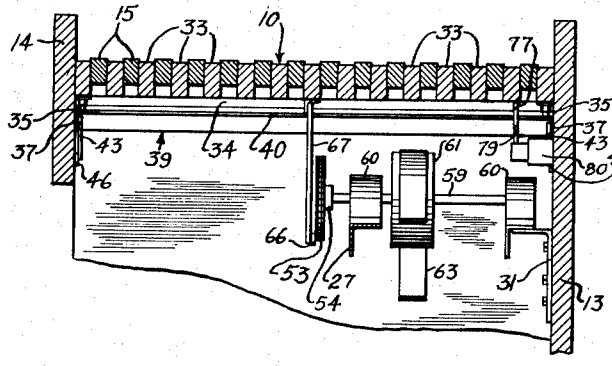
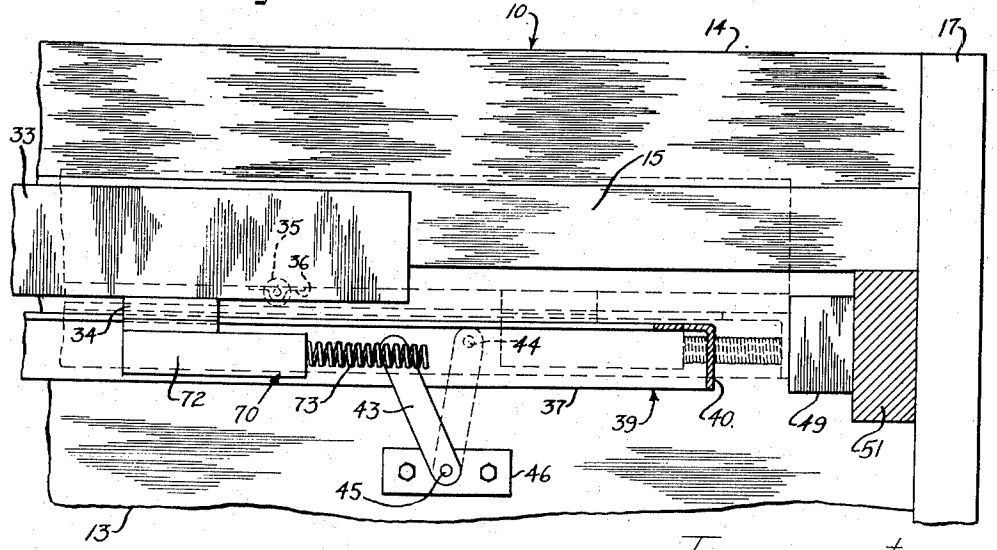


Fig. 6

Fig. 7



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Patented Feb. 16, 1954

2,669,343

UNITED STATES PATENT OFFICE

2,669,343

CONVEYER

Robert I. Berry, Chicago, Ill.

Application February 10, 1950, Serial No. 143,453

7 Claims. (Cl. 198—219)

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This invention relates to improvements in check-out stations for self service stores or the like, and more particularly relates to an improved check-out station having a stationary counter wherein the goods are mechanically delivered to the checker or cashier for checking and then taken away for packaging.

An object of my invention is to provide a new and improved check-out station for self service stores or the like, arranged to speed the checking operation and the passage of customers past the cashier, by providing a stationary counter for receiving the customer's goods and by providing disappearing conveying means movable along the counter, to take the goods to the cashier for checking and to take the goods away from the cashier for packaging.

Another object of my invention is to provide a novel and improved form of check-out station having an elongated counter formed by a plurality of parallel spaced stationary slats with reciprocating conveying means guided for movement in the spaces between the slats and movable vertically into position to lift the goods from the surface of the counter and carry the goods along the counter, and leaving a stationary goods-receiving means behind the conveying means to permit the customer to put merchandise on the counter at any time during operation of the conveying means.

A further object of my invention is to provide a more efficient form of check-out station for self service stores than formerly by providing an elongated stationary counter formed by a plurality of parallel spaced slats and by slidably guiding a plurality of movable slats in the spaces between the stationary slats, and elevating the movable slats to position their top surfaces in a plane above the stationary slats to lift the goods deposited on the stationary slats thereabove and carry them to the cashier, and lowering the movable slats beneath the plane of the stationary slats at the end of the forward travel thereof and returning to the receiving end of the counter beneath the top thereof, and thereby depositing the goods on the counter adjacent the cashier without stopping operation of the conveyor, and providing a stationary goods-receiving station to the rear of the movable slats and at the point of discharge thereof.

A still further and more detailed object of my invention is to provide a check-out station for self service stores or the like including an elongated counter comprising a plurality of parallel spaced slats extending for substantially the full

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length thereof, the top surface of which provides a receiving and support means for merchandise deposited thereon, and by providing two disappearing conveyors movable along said slats, one picking up and delivering the merchandise deposited at the receiving end of the counter to the cashier and then disappearing beneath the top surface of the counter, and the other delivering goods transferred from the cashier for bagging at the discharge end of the counter and disappearing beneath the counter and returning to the cashier at a lower level than the level of the top of the counter.

A still further object of my invention is to provide a new and improved form of check-out station for self service stores or the like delivering the merchandise to and taking it away from the cashier in two stages by two independently operable reciprocably movable disappearing conveyors, so arranged as to leave a stationary counter for the reception of goods in their wakes and disappearing beneath the top of the counter to deposit the merchandise thereon at the ends of their forward paths of travel, and traveling in a return path in this lowered position.

These and other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a top plan view of a check-out station constructed in accordance with my invention;

Figure 2 is a view in side elevation of the check-out station shown in Figure 1, looking from the inner side thereof, with the cashier's station removed;

Figure 3 is an enlarged detail view in side elevation of the receiving end of the check-out counter, with certain parts thereof broken away and certain other parts shown in substantially longitudinal section;

Figure 4 is an enlarged fragmentary plan view of the receiving end of the check-out station, with the top of the counter removed in order to show the supporting track for the reciprocating conveyor and certain details of the drive mechanism for the conveyor;

Figure 5 is an enlarged fragmentary transverse sectional view showing the reciprocating conveyor elevated into position to convey merchandise along the check-out station;

Figure 6 is a view somewhat similar to Figure 5 but showing the reciprocating conveyor recessed beneath the top of the counter during its return travel; and

Figure 7 is an enlarged fragmentary detail view in side elevation of the receiving end of the check-out station with certain parts broken away and certain other parts shown in longitudinal section and illustrating the manner in which the conveyor is elevated with its top surface above the supporting surface of the counter.

In Figures 1 and 2 of the drawings, I have shown an elongated check-out counter 10 having a base 11 for a cash register 12 extending from one side thereof, intermediate the ends thereof, and forming a station for the checker or cashier.

The check-out counter 10 includes generally an elongated counter structure having two parallel spaced side frame members 13 and 14, connected together at their ends to form a rectangular frame structure. A plurality of uniformly spaced parallel slats 15—15 extend longitudinally between the side frame members 13 and 14 a slight distance beneath the tops of said side frame members and form a stationary merchandise supporting surface for the counter. The slats 15—15 are connected to and are spaced apart intermediate their ends and at their receiving and discharging ends by spacer blocks 16—16, and form a unitary stationary counter structure from one end of the counter to the other.

The side frame members 13 and 14 are connected together at the receiving end of the counter by an end frame member 17 extending above the top thereof, to prevent goods from falling or from being knocked off the receiving end of the counter. The end frame member 17, as herein shown, extends upwardly from a base 18 for the counter and forms a supporting leg for one end thereof. The supporting leg for the opposite end of the counter is formed by an end frame member 19, extending upwardly from the base 18 and having the discharge ends of the slats 15—15 supported thereon. The side frame members 13 and 14 are also secured to opposite sides of the end frame members 17 and 19. The side frame member 13 extends to the ground and closes the counter on the customer's side. The counter is, however, open on the cashier's side and the space beneath the slats 15—15 may have the conveyor drive mechanism supported therein, and also may have shelves and partitions therein (not shown), for the storage of bags or containers for bagging the merchandise and also for articles of merchandise which may be displayed on the cash register base 11.

Two reciprocating and disappearing conveyors 24 and 25 are provided for moving goods along the counter 10 from the receiving end thereof to the cashier's station adjacent the base 11 and from the cashier's station to the bagging station at the discharge end of the counter. The conveyor 24 serves to deliver goods to the cashier, and the conveyor 25 takes goods from the cashier's station and delivers it for bagging or packing at the discharge end of the counter. The reciprocating conveyors 24 and 25 are each of a similar construction so one only need herein be shown and described in detail. Said conveyors are driven by individual motors 26—26, herein shown as being suitably mounted on and extending inwardly from the side frame member 13. The drive mechanism for the conveyors is mounted on a frame structure 27 extending longitudinally of the counter 10 in a plane spaced beneath the side frame member 14 and supported at its ends on the end frame members 17 and 19 on angles 29—29. The frame structure 27 is also supported on the inside of the front wall 13 of the counter on angles 31—31, secured thereto and extending inwardly therefrom.

The conveyor 24 includes a plurality of parallel spaced slats 33—33 guided between the slats 15—15 for movement therealong and for vertical movement with respect thereto. As shown in Figures 5 and 6, the slats 33—33 project beneath the slats 15—15 and are connected together by cross bars 34—34 secured to the bottoms thereof and extending thereacross. A plurality of rollers or wheels 35—35 are mounted inwardly of the cross bars 34—34 on roller brackets 36—36 secured to the bottoms of the outermost slats 33—33 and depending therefrom. The wheels 35—35 movably support the slats 33—33 on the top surface of a track structure 39 formed by the horizontal legs of angles 37—37.

The track structure 39 is herein shown as being an open frame work slidably mounted between the side frame members 13 and 14 and including the angles 37—37 connected together at their ends by angles 40—40, and braced by braces 41—41 connected across the corners of said angles (see Figure 4). The track structure 39 is supported on the side frame members 13 and 14 on a plurality of parallel links 43—43. The links 43—43 are pivotally connected to the insides of the vertical legs of the angles 37—37 on pivotal pins 44—44. Said links depend from said pivotal pins and are pivotally supported at their lower ends on pivotal pins 45—45, secured to and extending outwardly from support blocks 46—46 secured to the insides of the side frame members 13 and 14 and extending inwardly therefrom. The links 43—43 support the track structure 39 for movement along the counter 10 above the axes of pivotal movement of the links 43—43 into engagement with abutment blocks 49—49 and 50—50 at the extreme ends of the forward and return strokes of the conveyor. The blocks 49—49 extend inwardly from a member 51 secured to the inside of the end member 17 and forming a support for the ends of the slats 15 at the receiving end of the counter. The blocks 50—50 extend from a member 52, extending across the side frame members 13 and 14 and supporting the slats 15—15 intermediate their ends. During movement of the track structure 39 about the pivotal pins 45—45, it also moves vertically from the position shown in solid lines in Figure 7 to that shown in dotted lines in this figure at the end of the return stroke of the conveyor, and elevates the slats 33—33 above the top surface of the slats 15—15, to pick up goods laid on counter 10 and move it therealong to the cashier's station at which time the track structure 39 will move about the links 43—43 to a lowered position. The means for elevating and lowering the track structure 39 is effected in a simple manner by abutting engagement with the conveyor 24 at opposite ends of its strokes, as will hereinafter more clearly appear as this specification proceeds.

The means for reciprocably driving the conveyor 24 includes an endless chain 53 trained around a drive sprocket 54 adjacent the motor 26 and intermediate the path of travel of the conveyor 24. The endless chain 53 is also trained around an idler sprocket 55 spaced from the sprocket 54 towards the discharge end of the conveyor. The sprockets 54 and 55 overhang the frame structure 27 and the idler sprocket 55 is rotatably mounted on the end of transverse shaft

56 journaled on said frame structure in bearing boxes 57—57. The drive sprocket 54 is likewise mounted on the frame structure 27 on the overhanging end of a transverse drive shaft 59, journaled on said frame structure on bearing boxes 60—60. A drive pulley 61 is herein shown as being mounted on the shaft 59 intermediate the bearing boxes 60—60 and is driven from the motor 26 by means of a belt 63 trained around a drive pulley 64 driven from the motor 26 through a speed reducer indicated generally by reference character 65 incorporated in said motor and not herein shown or described in detail, since it forms no part of my present invention.

The endless chain 53 has a connecting lug 66 extending outwardly from a link thereof, on the side of the chain opposite from the frame structure 27, to which is pivotally connected a drag link 67. The opposite end of the drag link 67 is pivotally connected to an ear 69 secured to and depending from a center slat 33 of the reciprocating conveyor 24, intermediate the ends thereof. The drag link 67 is sufficiently long and the sprockets 54 and 55 are spaced from the ends of the path of travel of the conveyor 24 a distance sufficient that the conveyor 24 will be reciprocably moved by said drag link from the receiving end of the counter to an intermediate position adjacent the cashier's station and back during each cycle of the path of travel of said endless chain.

The means for effecting pivotal movement of the links 43—43 and raising and lowering the track structure 39 at the ends of the forward and return strokes of the conveyor 24 includes a plurality of spring bumper elements 70—70 spaced beneath and extending in advance of the forward and rear ends of the slats 33—33, for engagement with the track structure 39 at the ends of the strokes of the conveyor. The bumper elements 70—70 are secured to the bottom of the cross bars 34 adjacent the outer ends thereof. Each bumping element 70 includes a support member 72 secured to said cross bar and extending in advance thereof in parallel spaced relation with respect to the slats 33—33. A coil spring 73 is suitably secured to the advance end of the member 72 and projects therefrom for engagement with the angle 40 of the track structure 39. Engagement of the springs 73—73 with the track structure 39 at the end of the return stroke of the conveyor will pivot the links 43—43 and track structure 39 toward the end bumpers 49—49 as the drag link 67 rounds the drive sprocket 54. The arcuate movement of the ends of the links 43—43 will elevate the track structure 39 and slats 33—33 of the conveyor 24 to pick up the merchandise from the receiving end of the counter 10. At the end of the forward stroke of the conveyor, engagement of the opposite springs 73—73 with the opposite end of the track structure 39 will pivot the links 43—43 in a counterclockwise direction and lower said track structure and position the tops of the slats 33—33 of the conveyor beneath the tops of the slats 15—15.

Pivotal movement of the links 43—43 and longitudinal movement of the track structure 39 toward the receiving end of the counter is limited by the abutment members 49—49 and movement of said links and track structure in an opposite direction is limited by the abutment members 50—50. When the track structure 39 is in the elevated position shown in Figures 3 and 5, it remains in this position by reason of the fact

that the parallel links 43—43 are beyond a dead center position the weight of the slats 33—33 holding the end of the track structure 39 in engagement with the abutment members 49—49.

Two push buttons 75 and 76 are provided to independently start the motors 26—26 and the conveyors 24 and 25. These push buttons are connected in suitable electric circuits (not shown) so arranged that when the push button 75 is pressed the conveyor 24 will start and move throughout the entire length of its forward or conveying stroke and for part of the length of its return stroke. Return travel of the conveyor 24 is limited by a depending projection 77 engageable with an operating arm 79 of a limit switch 80, upon the return stroke of the conveyor. This will stop the respective motor 26 and the conveyor 24 until the push button 75 is again pressed, at which time said conveyor will complete its return stroke and the springs 73—73 will come into engagement with the end of the track structure 39 and pivot the links 43—43 in a clockwise direction and engage the end of said track structure with the abutment members 49—49 and elevate the slats 33—33 to position their top surfaces in a plane above the plane of the slats 15—15, to pick up the merchandise deposited on the counter 10 and carry it therealong to the cashier's station, intermediate the ends of said counter. As the drag link 67 passes around the sprocket 55, the opposite springs 73—73 engaging the opposite end of the track structure will lower said track structure and slats 33—33 causing said slats to deposit the merchandise on the counter at the cashier's station.

In a like manner when the push button 76 is pressed the conveyor 25 will move to the end of its return stroke. The slats 33—33 thereof will then move upwardly and pick up the merchandise transferred across the center of the counter by the cashier, and carry it to the discharge end of the counter for bagging. At the end of the conveying stroke of the conveyor 25, it will engage the end of its supporting track structure (not shown) and move said track structure toward the discharge end of the counter, lowering said conveyor and leaving the articles of merchandise on the counter as said conveyor travels in a return direction toward the cashier's station.

In operation of the check-out counter, merchandise may be unloaded onto the receiving end of the counter 10 on the slats 15—15, said slats being stationary at all times and forming a stationary counter on which the merchandise may be placed while the conveyor 24 is moving therealong toward the cashier's station. When the merchandise has been unloaded at the receiving end of the counter, the cashier standing in a position to look toward this end of the counter, may depress the push button 75 to effect elevation of the top surfaces of slats 33—33 above the top surface of the slats 15—15 and cause the slats 33—33 to pick up the merchandise deposited on the counter and move as a unit with the merchandise toward the cashier's station. At the cashier's station, the slats 33—33 will then disappear beneath the top surface of the slats 15—15 and travel on their return path toward the receiving end of the counter 10 beneath the top surface thereof, operation of the conveyor being stopped by the limit switch 80 at a suitable point along a return path of travel thereof. The goods deposited on the counter at the cashier's

station may then be checked, and as each article is checked it may be moved across the center of the counter by the cashier and positioned to be picked up by the conveyor 25. As the checking operation is completed the cashier may depress the push button 76 and cause the slats 33—33 of the conveyor 25 to raise upwardly above the top surface of the slats 15—15 and pick up the goods thereon and advance it to the delivery end of the counter for bagging. As soon as the conveyor 25 starts to move toward the delivery end of the counter, the cashier may check and place the next batch of goods in position to be picked up by said conveyor.

It may be seen from the foregoing that the arrangement of conveyors herein disclosed forms a relatively long counter which is always stationary to receive merchandise, and that the two stage disappearing conveying system incorporated therein delivers the merchandise to the cashier and deposits it in a convenient position for checking and transfer to the next conveyor of the two stage system during the checking operation and without stopping operation of the conveyor. It may further be seen that the goods may be deposited on the counter during operation of the first conveyor as soon as it leaves the receiving end of the counter and that the goods may be transferred from one conveyor into position to be picked up by the other conveyor while both conveyors are in operation.

It may further be seen that with the counter of my invention the goods is automatically deposited in front of the cashier and that the cashier is required to pay little or no attention to the conveyors moving along the counter, only starting them when merchandise is in position to be loaded thereon. It may still further be seen that since the conveyors disappear beneath the top of the counter on their return strokes and leave a stationary counter behind them, that the device of my invention eliminates the use of continuously moving conveyors on the counter, with no place to discharge the goods during operation of the conveyors which has heretofore been a great disadvantage in conveyor type check-out stations.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. A check-out station for stores or the like comprising an elongated counter having a plurality of parallel spaced stationary slats forming a goods-supporting top thereof, and a plurality of movable slats guided between said stationary slats for movement therealong and for vertical movement with respect thereto, means connecting said movable slats together, a track supporting said movable slats for movement along said stationary slats, a plurality of parallel links supporting said track, power means reciprocably moving said movable slats along said track, and engaging connections between opposite ends of said movable slats and opposite ends of said track at opposite ends of the strokes of said movable slats, moving said track longitudinally about the axes of pivotal movement of said parallel links and elevating said track in position to elevate the tops of said movable slats to a plane above the plane of said stationary slats at the ends of the return strokes thereof and moving said track longitudinally in an opposite direction about the axes of pivotal movement of said parallel links and lowering the tops of said slats to a plane beneath the plane of said stationary slats at the end of the forward strokes thereof.

2. A check-out station comprising an elongated counter having a plurality of parallel spaced stationary slats forming a goods-supporting top thereof, a plurality of movable slats guided between said stationary slats for movement therealong and for vertical movement with respect thereto, means connecting said movable slats together, a track supporting said movable slats, a plurality of parallel links movably supporting said track, power means reciprocably moving said movable slats along said track, and yieldable bumping elements extending from opposite ends of said movable slats for engagement with said track at opposite ends of the strokes of said slats, and moving said track longitudinally about the axes of said parallel links in one direction to elevate the tops of said movable slats above the tops of said stationary slats at the ends of the return strokes of said movable slats and in an opposite direction to lower said movable slats beneath the tops of said stationary slats at the ends of the forward strokes thereof.

3. A check-out station comprising an elongated counter having a plurality of parallel spaced stationary slats forming a goods-supporting top thereof, a conveyor including a plurality of movable slats guided between said stationary slats for movement therealong and for vertical movement with respect thereto, means connecting said movable slats together, a track supporting said movable slats for movement therealong, a plurality of parallel links movably supporting said track, power means reciprocably moving said movable slats along said track including a motor, an endless chain driven thereby, a drag link connecting said endless chain with said movable slats and moving said movable slats therewith, and engaging connections between opposite ends of said movable slats and said track at opposite ends of the strokes of said movable slats, moving said track and links in position to elevate the tops of said slats to a plane above the plane of said stationary slats at the end of the return strokes of the conveyor and to lower said stationary slats beneath the plane of said stationary slats at the end of the forward strokes of the conveyor, effected solely by movement of said conveyor at the ends of its strokes.

4. A check-out station comprising an elongated counter having a plurality of parallel spaced stationary slats forming a goods-supporting top thereof, a disappearing conveyor including a plurality of movable slats guided between said stationary slats for longitudinal and vertical movement with respect thereto, means connecting said movable slats together, a track supporting said movable slats, a plurality of parallel links movably supporting said track, a motor, a power driven endless chain movable in a vertical plane, a drag link connecting said chain with said movable slats and moving said slats therewith upon movement with said chain, and yieldable bumping elements extending from opposite ends of said movable slats for engagement with said track at opposite ends of the strokes of said slats and moving said track longitudinally and upwardly about said parallel links to position the tops of said slats in a plane above said top of the counter at the end of the return strokes of said slats, and moving said track longitudinally in an opposite direction at the end of the forward strokes of

said slats to lower said track beneath the top surface of said counter.

5. A check-out station comprising an elongated conveyor having a plurality of parallel spaced stationary slats having abutment members adjacent opposite ends thereof, a disappearing conveyor guided for movement along said slats including a plurality of connected movable slats, a track supporting said movable slats for movement between said stationary slats, means cooperating with said abutment members and supporting said track in elevated and depressed positions, a motor, an endless chain driven thereby, a drag-link connecting said chain with said movable slats, and engaging connections between said movable slats and opposite ends of said track at opposite ends of the strokes of said slats, moving said track into engagement with one or the other of said abutment members into depressed or elevated positions, to raise said slats at the end of one stroke thereof, and to depress said slats at the opposite end thereof.

6. A check-out station comprising an elongated conveyor having a plurality of parallel spaced stationary slats having abutment members adjacent opposite ends thereof, a disappearing conveyor guided for movement along said slats including a plurality of connected movable slats, a track supporting said movable slats for movement along said stationary slats, a plurality of rocking members cooperating with said abutment members and pivotally connected with said track to support said track in elevated and depressed positions in engagement with one of said abutment members, a motor, means driven by said motor and connected with said movable slats for reciprocably moving said movable slats along said stationary slats, and said movable slats having abutting engagement with opposite ends of said track at opposite ends of the strokes of said movable slats, moving said track about said rocking members into engagement with one or the other of said abutment members and into depressed or elevated positions, to raise said movable slats at the end of one stroke thereof, and to depress said movable slats at the opposite end of the stroke thereof.

7. A check-out station comprising an elongated counter having a plurality of parallel spaced stationary slats, a disappearing reciprocating conveyor for moving goods along said counter including a plurality of connected reciprocably movable slats guided between said stationary slats for reciprocable movement therealong and for vertical movement with respect thereto, means connecting said movable slats together, a track supporting said movable slats for movement along said stationary slats, a plurality of rocking members pivotally connected with said track to support said track in elevated and depressed positions, abutment members at opposite ends of said stationary slats cooperating with said rocking members to limit rocking movement thereof in both directions of movement of said slats and hold said rocking members to support said track in elevated and depressed positions, and abutment means at opposite ends of said movable slats engageable with said track at opposite ends of the path of travel of said movable slats, to rock said rocking members and elevate said track at the ends of the return strokes of said movable slats, and to lower said track at the ends of the forward strokes to said movable slats solely by engagement of said movable slats with said track.

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