AUTOMATIC MERCHANDISE-DELIVERY APPARATUS
Ronald L. Gehrke, 418 Nassau Lane, Hayward, Calif.
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This invention relates to an automatic merchandise-delivery apparatus and, particularly, to an apparatus capable of delivering merchandise such as garments that cannot be readily packaged into neat bundles (without wrinkling or other undesirable effects).

In the clothing dry-cleaning industry the garments, as is well known, are preferably placed on hangers so that the garments will not become wrinkled. More recently the hangers are placed on a conveyor which comprises an endless chain 12 which moves horizontally. Each link of the chain is provided with a hook which holds an individual hanger. An attendant sets the conveyor in motion until the customer's garment is in front of him. Then the attendant must remove the garment by hand, deliver it to the customer, and record the transaction.

Another object of this invention is to automatically record the transaction so that the customer is billed accordingly.

Another object of this invention is to improve the particular garment accessible to the customer.

Yet another object of this invention is to provide an apparatus for delivering the garment to the customer faster and more economically than is done by presently used means.

Still another object of this invention is to eliminate the need for an attendant to deliver the garment.

Another object of this invention is to provide an improved apparatus for automatically delivering non-packagable merchandise.

In terms of broad inclusions the customer places an identification marker in a receiver whereby the conveyor is set in motion, and by electrical sensing means the conveyor is stopped when a particular garment is at the unloading zone; then means are set in motion for removing the garment and placing it in position for delivery to the customer. If the services are prepaid, the novel apparatus does not record the transaction, but if the services are billed monthly, then means are provided for recording the transaction.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred embodiment of the invention. One must understand that the invention is not limited to the disclosed embodiment only, but includes other variant embodiments thereof within the scope of the claims.

Referring to the drawings:

FIGURE 1 shows a cut-away view of the apparatus.
FIGURE 2 illustrates a close-up of one of the conveyor (enclosed by circle 2 of FIGURE 1), showing details of part of the sensing means.
FIGURE 3 is a cut-away view taken generally on line 3—3 of FIGURE 1.
FIGURE 4 is a close-up view of the portion enclosed by circle 4 in FIGURE 2.
FIGURE 5 is a plan view of a credit card and detail of the receiver box taken on line 5—5 in FIGURE 1.
FIGURE 6 is a sectional view taken on line 6—6 of FIGURE 5.
FIGURE 7 is a block diagram of an electrical circuit.
FIGURE 8 is a schematic of an electric circuit shown in FIGURE 7.

Referring to the drawings in greater detail and to FIGURE 1 in particular, in which only the delivery end of the novel apparatus is shown, the apparatus has an enclosure 10 which is preferably longer than it is wide and encloses a conveyor 11 in the form of an endless chain 12 which is supported by suitable rollers 13 in a channel 14. The channel 14 and chain 12 are preferably oval in shape and the channel 14 is supported on a post 16 at one end and a post (not shown) at the other end. A conveyor motor 17 rotates a sprocket 18 which, in turn, sets the chain 12 in motion so that it moves along horizontally. This part of the apparatus may be any standard conveyor such as used in the dry-cleaning art for storing garments.

Referring to FIGURE 2, every other link 19 of the chain 12 supports a coat hanger 20 and garment 21 with the aid of a bar 22 which is mounted on each link 19 by a hook 23, which is pivotally mounted to each bar 22 by a connecting pin 24. The hook 23 pivots at or near its center and is pivoted by a rod 26 engaging the upper end of the hook. The other end of the rod 26 is connected eccentrically onto a flywheel 27 of a garment-release motor 28 (FIGURE 1). A suitable support 29 from the roof of the enclosure 10 enables the rod 26 to move in the horizontal direction as the flywheel rotates.

When the hooks 23 are not engaged by the rod 26, they hang in the vertical position and the garments 21 hang neatly. When in the unloading zone (indicated by a circle 4, FIGURE 2), the hook 23 is engaged by the free end of rod 26 as the rod moves horizontally and towards the conveyor. The hook 23 then pivots and the hanger 20 disengages the hook 23 and is caught on a track 31, one end of which is now under the pivoted hook 23. The track 31 is suitably supported on the walls of the enclosure 10 by a support rod 32 (FIGURE 1). The garment 21 then slides along the track 31 by the force of gravity, off the track 31 at the other end, and is caught on one end of a lever 33, which is mounted at its other end to an axle 34 rotated by a drum motor 26. When the axle 34 rotates 180°, the hanger 20 and garment 21 on lever 33 are rotated with the axle 31 to the other end and are in an opening 37 in the enclosure 10. In order to prevent access to the remaining garments 21 on the conveyor 11 a security means in the form of a drum 38 (FIGURE 3) is provided within the enclosure 10. The drum 38 is mounted on axle 34 and rotates with the axle 34. The drum has an opening 39 formed in its side cylindrical wall and is shown in FIGURE 3 aligned with access opening 37 in the enclosure 10. As shown, the enclosure 10 has a cylindrical protrusion 40 formed in its wall and the axis of this cylindrical protrusion is aligned with the axis of the axle 34. The drum 38 has a top plate 42 and a bottom plate 43. The bottom plate 43 is a full circle but the top plate has a cut portion 44 which coincides with the opening 39 in the side wall of the drum 38. As shown in FIGURE 1, the cut portion 44 of the drum, hanger 20 and garment 21 fall from the track 31 clear of the top plate 42 onto the lever 33, but when the axle rotates 180° the top plate 42 swings under the track 31 and with the aid of a cover plate 46 covering the protrusion 40 of the enclosure 10, the interior of the enclosure 10 is safely shut off from the outside.

This apparatus is set into operation by a person with the aid of a special identification means such as a card 47 (FIGURE 5). The structure of the identification means will be more fully described hereinafter. The card 47, when it is placed within the slot of a control box 48 (FIGURE 1) causes an electrical impulse to start conveyor motor 17 and move the garments 21 on the conveyor 11 in turn past the unloading zone 4. Then, when the particular garment which belongs to the person outside the enclosure 10 is within the unloading zone,
the motor 17 automatically stops, and preferably with the aid of a brake (not shown) stops the conveyor 11 and the carriage 10 and lands on lever 33, the lever deflects engaging a microswitch 49 which causes the drum motor 36 to start, thereby rotating the axle 34 and drum 33 180°, and then by tripping another microswitch (not shown), the motor 36 stops. The opening 39 in the drum 38 and the opening 37 in the enclosure 10 are aligned and the person has access to his garment only. Another person coming after the first person, by also placing his particular card in the slot in the control box 48, can also receive his particular garment. Since the drum 38 should be ready to receive the next garments, suitable electrical contact means are provided to allow the drum to turn another 180° as the next card is placed in the control box 48.

A block diagram for this control system is shown in FIGURE 7. When the card is placed in the slot of the control box 48, which is a first electrical sensing means, the control box 48 sends the impulse to the drum motor 36, which impulse ensures that the drum 38 is in the proper position and starts the drum motor to place it there if it is not. Also the control box 48 sends the impulse to the conveyor motor 17, which impulse starts the motor. When a particular garment 21 is in the unloading zone, the sensing means 50 on the conveyor sends out a coded impulse which matches the coded impulse from the control box 48. The sensing means 50 then sends an impulse to the conveyor motor 17, stopping this motor and the sensing means 50 sends an impulse to the garment release motor 28 causing this motor to rotate the flywheel 26 one revolution after the motor 17 stops.

As mentioned above, the card 47 has a special construction to form an electrical sensing means. To illustrate one typical card construction, let us refer to FIGURE 5, which shows a cross-section of the card 47. The card is made of a thin hard plastic sheet having a plurality of holes 52 which have a predetermined location on the card and are preferably placed in a straight line. The plastic sheet is also an electrical insulator. On the plan view of the card appears a place for the customer's name and address somewhat as shown. The letters of the name and address are raised, whereby, when the card 47 is placed in the slot of the control box 48, the customer's name and address are recorded on a tape 54, which feeds off a roller 55 and onto a roller 57. A small motor 58 turns the roller 57 at the right time so that an unused portion of tape 54 is over the next card. The card 47, when it is placed within the slot, fits between a fixed platform 61 (FIGURE 6) and the tape 54. Between the card 47 and the platform 61 is a resilient insulating member 62 with ten metal plugs 63 spaced evenly in a row and are made so that some of the plugs 63 pass through all the holes 52 in the card. Each plug 63 has a wire 64 connected to it. On being fully inserted the card hits a microswitch 65 which actuates a motor (not shown) whereby a metal plate 66 is pressed against the fixed platform 61. The name and address and date, which is on a dater 67, are recorded on the tape 54. When the plate 66 presses on the card 47, the plugs 63 contact the platen and each plug makes the electrical coded impulse from the control box 48 mentioned above. Since member 62 is resilient and compresses, the plugs 63, which are aligned with holes 52, contact the platen and make an electrical contact there with when the platen is pressed against the card. Then, every customer has his specific arrangement of holes 52. For example, the plugs 63 are lettered A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, on a rack 68 FIGURE 14) which is supported on the conveyor channel 14 in a fixed position. Only tracks A'—E' are shown due to space limitation. Each track A' to J' is connected to a wire 69. Each track A' to J' is matched, respectively, to a plug 3 as will be explained hereinafter, whereby, when the correct bar 22 contacts the track which corresponds to a second electrical impulse and the correct garment 21 is in the unloading zone 4. Then, as explained above, the garment on the hook 23, which is mounted on the correct bar 22, is removed and delivered to the person.

Referring to FIGURE 6, the link 19 has the bar 22 depending from it. Each bar 22 has metal shorting bar 71 with a series of ten small apertures 72 (of which only five are shown) arranged one over the other and aligned with tracks A'—J'. A contact jack 73 which has a metal tip resilient and can be placed in each aperture or in some of the apertures as desired so that the correct coded signal will be made as the resilient ends of each jack 73 contact the corresponding tracks A' to J'. As mentioned above, each customer has a credit card 47 with his name and address. Each customer has a code denoted by the quantity and position of holes 52. When an attendant loads the conveyor with the garments which were dry-cleaned and are ready for pick-up by the customer, he readily removes the jacks 73 from the empty links, loads the hook 23 with a garment and replaces the jacks 73 in the correct apertures which correspond to the customer's code.

Referring to FIGURE 8, a schematic of a preferred circuit is shown for decoding the signal given by the customer's card. An A.C. power supply 101 is connected to the primary of a transformer 102. The secondary has a middle tap which is grounded. One end of the secondary is connected to the metal platen 66 in the control box 48 which is represented by a bus bar 103. A rectifier 104 is placed between the bus bar 103 and the secondary is connected to the metal platen 66 in the control box 48. The other end of the secondary is connected to the shorting bar 71 on the link 19 of the conveyor. A rectifier 106 is placed between the shorting bar 71 and the secondary so that the current flows toward the shorting bar. A pair of equal capacitors 107 and 108, connected in series, are placed across the secondary in series with the rectifiers 104 and 106. The junction between the capacitors is also grounded. This arrangement makes the shorting bar 71 positive with respect to ground and makes the bus bar 103 negative with respect to ground, and in this embodiment ground is at zero potential, the shorting bar being at plus 9 volts, and the bus bar at minus 9 volts. A rectifier 109 is placed in a series circuit which includes one-half of the turns of the secondary of the transformer 102, the rectifier 104 and a solenoid coil 110. The emitter of the transistor 109 is grounded and therefore at ground potential and the collector of the transistor 109 is connected to the coil 110, placing the collector at the
negative potential. The base of the transistor 109 is connected to the rectifier 106 through a resistor 112. Another transistor 113 is connected parallel to transistor 109 with its emitter grounded and its collector connected to the rectifier 104 through a resistor 114. The base of the transistor 110 is connected to the collector of transistor 113 through a rectifier 116 which is arranged so that current flows from the base to the collector. The base of transistor 113 is connected to rectifier 104 through a resistor 117. The bus bar 103 and the shorting bar 71 are connected by 10 banks: a, b, c, d, e, f, g, h, i, and j of two series resistors 118, all of the same resistance. Each bank a through j corresponds to plugs 63 A through J and tracks A' through J' on the conveyor. The base of transistor 113 is connected through a resistor 121 to each junction formed by two of the resistors 118, which are in series. A rectifier 122 is in series between resistor 121 and each of the junctions, and the rectifiers 122 are arranged so that current flows only from the junction to the base of transistor 113. The base of transistor 109 is similarly connected to the same junction through a rectifier 123 and a resistor 124 and one of ten rectifiers 125. The rectifier 123 and resistor 110 will not be affected by current flows from the base to the junction. Ten switches 130–139 correspond to the contacts made between jacks 75 and tracks A–J. Ten switches 140–149 correspond to the contacts made between the plugs 63 and the plate 150. A switch 150 is placed between the negative side of the secondary and bus bar 103 and is automatically closed as the card 47 hits the microswitch 64 (FIGURE 5), whereby the conveyor motor 17 is put in operation.

This circuit operates in the following manner: Current flows from rectifier 106, through resistor 112, rectifier 116, and resistor 114. By making resistor 112 fifteen kilohms and resistor 124 twenty-two hundred ohms, the base of transistor 109 is slightly negative with respect to ground, thereby current flows through solenoid coil 110. Solenoid coil 110 actuates a bank of switches 155, 156, and 157. The bank is made so that when switch 155 to conveyor motor 17 is closed, switch 156 to a brake for the conveyor is open, and switch 157 to the garage release motor 28 is open. If any of the switches 140–149 is opened without the corresponding switches 130–139 being closed, the current in the second electrical coded sensing circuit is stopped since the potential of the base of transistor 109 is unaffected because one of the junctions between resistors 118 is negative. If any of the switches 130–139 is closed without any of the corresponding switches 140–149 being closed, the current in the coded sensing circuit is unaffected because one of the junctions between resistors 118 is positive, which makes the base of transistor 113 positive with respect to ground and no current flows through transistor 113, making its collector negative since resistor 114 is fifteen hundred ohms. When the same switches 130–139 are closed, as the switches 140–149, the junction is at ground potential and the base of transistor 109 is slightly positive, since it is connected to junction through resistor 124 which is twenty-two hundred ohms, thereby causing no current to flow in coil 110. This, then, opens switch 155, closes switch 156, and closes switch 157. This corresponds to the situation, as mentioned above, when the customer's garment is in the unloading zone and the position of the jacks 73 on the hook 23 which holds the garment corresponds to the position of the holes 52 in the card. One observes that the coded impulse is formed by any number of switches 140–149 being closed and the matching coded impulse is formed by the same switches 130–139 being closed. Also, if the same number of switches 130–139 are closed as the number of switches 140–149 are closed but do not match, current would flow in coil 110 because the base of transistors 109 and 113 will not see ground potential at all the junctions between resistors 118.

As mentioned above, the motor 28 makes one complete turn of the flywheel 27 and stops. A programming box 158 is placed in the circuit of motor 28 to perform this function.

To summarize the operation of the apparatus, a customer places his card 47 in a control box 48 located outside enclosure 10. This puts the conveyor in motion and closes the opening 37, since the drum 38 turns, placing its opening 39 inward. When the customer's garment is in the unloading zone 4, the conveyor stops automatically by switching off the motor 17 and applying the brakes. The garment release motor 28 starts turning at this time, dislodging the garment from the conveyor and the garment moves into the drum 38. The switch 49, turning the drum 180° and the garment is exposed to the customer. When the customer removes his card, the motor is stopped and moved so that the next customer's delivery may be recorded. The enclosure 10 shows drawers 161 with locks for receiving soiled garments which a customer wants cleaned.

I claim:

1. An automatic merchandise delivery apparatus comprising a conveyor including a plurality of hooks with merchandise disposed on some of said hooks, a conveyor motor means for motivating said conveyor whereby each piece of merchandise will pass in turn through an unloading zone, identification means keyed to a particular piece of merchandise on said conveyor, first and second electrical sensing means in cooperation with said identification means and such of said hooks on said conveyor for stopping said conveyor motor means when said particular piece of merchandise is in said unloading zone, and automatic motor means for removing said particular piece of merchandise.

2. An automatic merchandise delivery apparatus comprising a conveyor including a plurality of hooks with merchandise disposed on some of said hooks, conveyor motor means for motivating said conveyor whereby each piece of merchandise will pass through an unloading zone, an identification receiving means for receiving a customer's coded identification means, a first electrical sensing means in cooperation with said identification receiving means, a second electrical sensing means disposed in stationary relation, a differently coded sensing means on each of said hooks for cooperating in turn with said second electrical sensing means in circuit means for stopping said conveyor motor means and said conveyor when a particular hook is disposed in said unloading zone, and automatic motor means for removing said merchandise from said hook in said unloading zone.

3. The automatic merchandise delivery apparatus of claim 2 wherein said identification means is a card comprising a plastic sheet having at least one hole disposed in a predetermined position, and each of said hooks has at least one metal jack also disposed at predetermined location on said hooks, the location of said metal jack on said hooks being keyed to the location of the holes of different cards.

4. An automatic merchandise delivery apparatus comprising a conveyor including a plurality of hooks with merchandise disposed on some of said hooks, conveyor motor means for motivating said conveyor whereby each piece of merchandise will pass through an unloading zone, an identification receiving means for receiving a customer's coded identification means, a first electrical sensing means in cooperation with said identification receiving means, a second electrical sensing means disposed in stationary relation, a differently coded sensing means on each of said hooks for cooperating in turn with said second electrical sensing means, said differently coded sensing means being keyed to different identification means, circuit means for stopping said conveyor motor means and applying a brake means to stop said conveyor when the coded sensing means on said hook is keyed to said customer's coded identification means cooperates with said second electrical sensing means whereby a particular
piece of merchandise is stopped in said unloading zone, and automatic motor means for removing said particular merchandise from its hook.

5. The automatic merchandise delivery apparatus of claim 4 wherein an enclosure encloses said conveyor and merchandise, said identification receiving means is disposed outside of said enclosure, and merchandise delivery opening formed in said enclosure, a drum means within said enclosure has an opening for receiving said particular merchandise after removal from its hook, said drum means closes said opening of said enclosure whereby said conveyor and merchandise thereon are not accessible from outside said enclosure, and said drum means makes accessible only said particular merchandise to the outside of said conveyor.

6. The automatic merchandise delivery apparatus of claim 5 wherein a recording means is disposed in cooperation with said identification receiving means for recording the removal of said particular merchandise from said enclosure.

7. An automatic merchandise delivery apparatus comprising a conveyor including links and hooks on each link, said conveyor disposed to move horizontally and in a closed loop, merchandise in the form of garments depending from some of said hooks, a conveyor motor means for motivating said conveyor whereby each garment in turn passes through an unloading zone, an identification receiving means for receiving a customer's coded identification means, a first electrical sensing means in cooperation with said identification receiving means for sensing the code on said identification means, a second electrical sensing means disposed in stationary relation, a circuit means connecting said first and second electrical sensing means, a different coded sensing means on each of said hooks for cooperating in turn with said second electrical sensing means as said conveyor moves, said different coded sensing means keying to different coded identification means, said circuit means stopping said conveyor motor means when the coded sensing means on said hook which is keyed to said customer's coded identification means cooperates with said second electrical sensing means whereby a particular garment is stopped in said unloading zone, and automatic motor means for removing said particular garment from its hook.

8. The automatic merchandise delivery apparatus of claim 7 wherein an enclosure encloses said conveyor and merchandise, said identification receiving means is disposed outside of said enclosure, and merchandise delivery opening is formed in said enclosure, a drum means within said enclosure has an opening for receiving said particular merchandise after removal from its hook, said drum means closes said opening of said enclosure whereby said conveyor and merchandise thereon are not accessible from outside the enclosure, and said drum means makes accessible only said particular merchandise to the outside of said conveyor.

9. The automatic merchandise delivery apparatus of claim 8 wherein a recording means is disposed in cooperation with said identification receiving means for recording the removal of said particular merchandise from said enclosure.

References Cited in the file of this patent

FOREIGN PATENTS

717,018 Great Britain Oct. 20, 1954