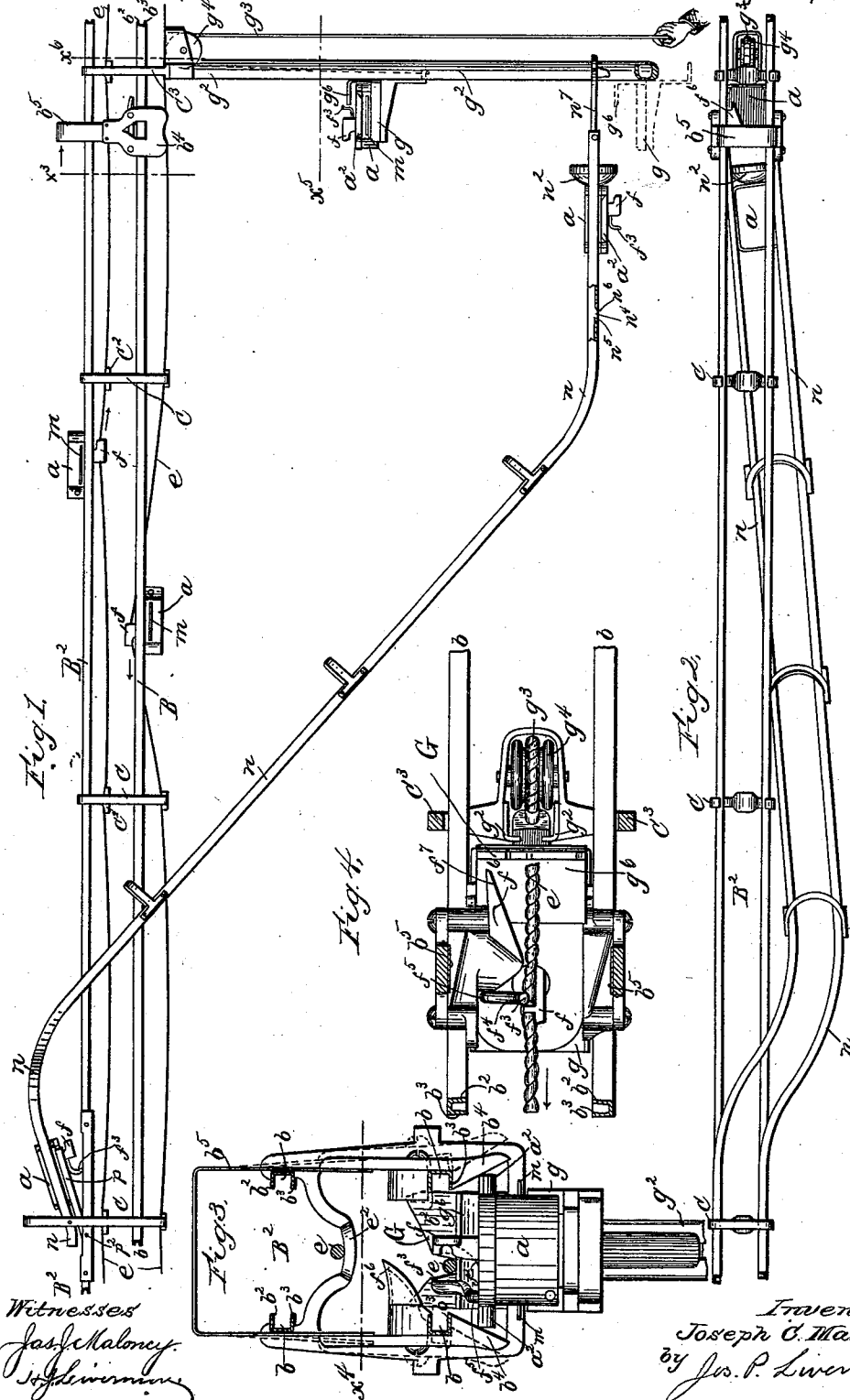


J. C. MARTIN.  
CONVEYING APPARATUS.

No. 539,527.

Patented May 21, 1895.



(No Model.)

3 Sheets—Sheet 2.

J. C. MARTIN.  
CONVEYING APPARATUS.

No. 539,527.

Patented May 21, 1895.

Fig. 5.

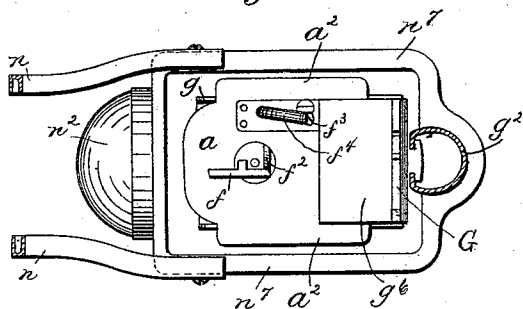


Fig. 6.

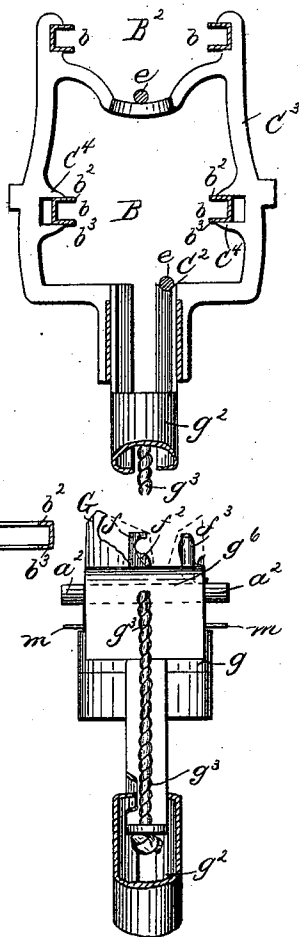


Fig. 11.

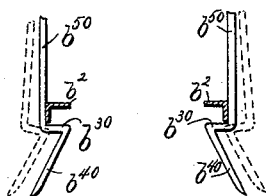
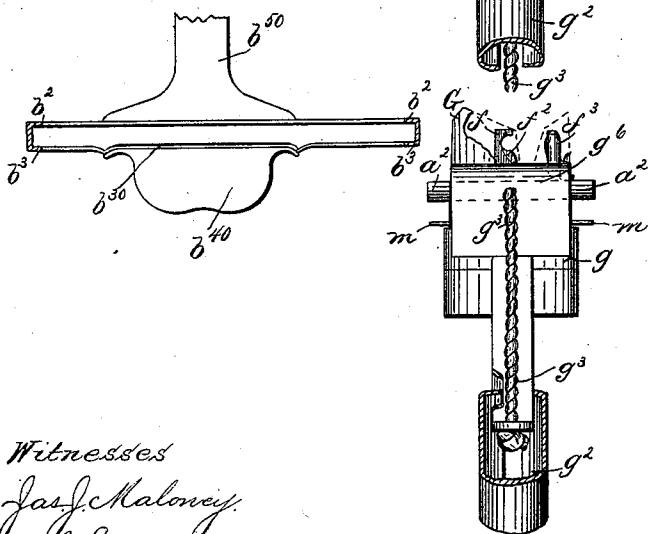


Fig. 12.



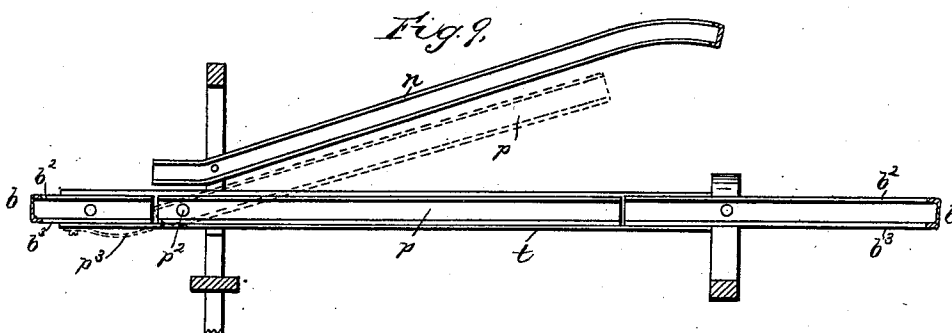
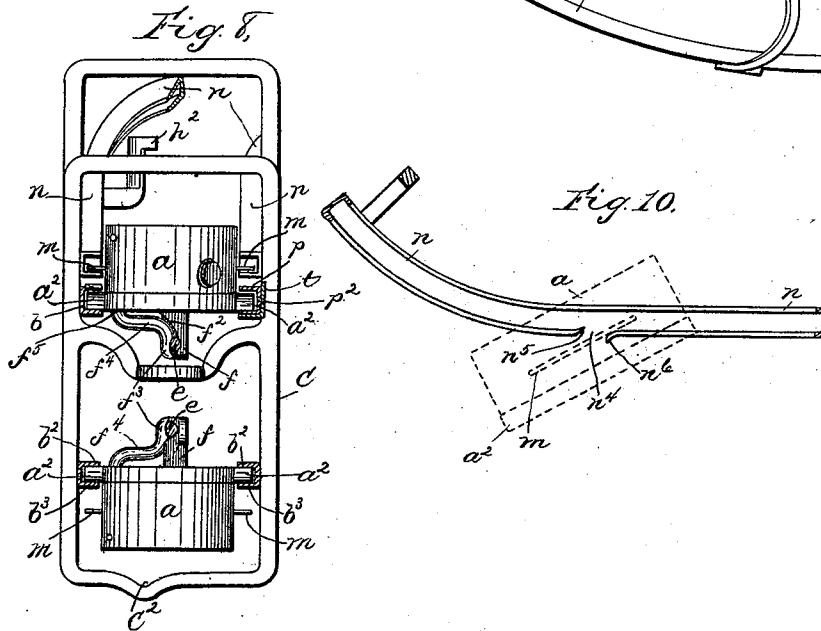
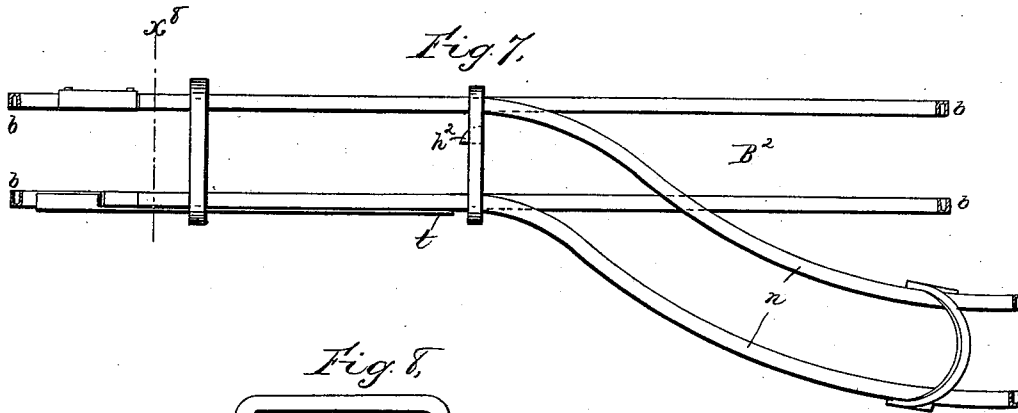
Witnesses  
Jas. J. Maloney  
J. P. Linnell

Inventor.  
Joseph C. Martin.  
by J. P. Linnell  
Att'y.

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CONVEYING APPARATUS.

No. 539,527.

Patented May 21, 1895.



Witnesses  
*Jas. J. Maloney.*  
*H. L. Linn.*

Inventor,  
*Joseph C. Martin.*  
by *Jos. P. Linn.* Att'y

# UNITED STATES PATENT OFFICE.

JOSEPH C. MARTIN, OF NORTHAMPTON, MASSACHUSETTS.

## CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 539,527, dated May 21, 1895.

Application filed September 21, 1894. Serial No. 523,737. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH C. MARTIN, of Northampton, (Florence,) county of Hampshire, State of Massachusetts, have invented an Improvement in Conveying Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a conveying apparatus adapted for use in stores for carrying money back and forth between the cashier's desk and the stations at which the sales are made and for other analogous uses.

The invention is shown embodied in an apparatus which in its main features is substantially like that shown in Letters Patent No. 399,150, granted to me March 5, 1889, the present invention relating mainly to novel features of construction of the track and appliances at stations along the line where the several conveyers are to be applied to the forwarding track and delivered from the return track. The main portion of the track and of the carriers and the means for propelling the carriers along the track by an endless cord or cable and the clutches upon the carriers in the apparatus, forming the subject of this invention, may be and are shown as substantially the same as in my former patent, No. 399,150, and the means for delivering different carriers at different stations on what is called the "return track," namely, that on which the carriers return from the cashier's desk to the counters or sales-stations,—are also substantially as shown in said patent, the said carriers having flanges which engage with delivering tracks, which are inclined to the line of the main track, so that the carriers run off from the main track to the delivery point while supported by said flanges on the delivery track, means being provided for disconnecting their clutches from the cords after they have traveled a certain distance upon the delivery track. In the apparatus described in the said former patent, however, no means are provided for automatically applying the carrier to the forwarding track and attaching it to the cable at the sales-stations when the said carrier is to be sent to the cashier's desk, but in the apparatus shown in said former patent the carrier is

simply placed by the operator upon the track, a portion of the upper guide surfaces of the rails being removed for that purpose, after which the carrier is secured to the cable by giving the carrier a slight push in its forward direction so that the clutch will be closed by a projection provided for that purpose. This arrangement necessitates the placing of the tracks at each of the sales stations or delivery points sufficiently low to be easily accessible to the operator, and in carrying the tracks around the store it is further necessary that wherever the said tracks cross an aisle or open floor space they should be at a height sufficient to clear the heads of people passing through the store. This necessitates frequent variations in level requiring a large number of curves or angles of the track throughout the system, thus largely increasing the expense of construction, as the curves and angles are the most expensive part of the structure.

The present invention aims to obviate this disadvantage and consists mainly in devices whereby the carriers may be placed on and delivered from the track at a point some distance above the counter so that the said tracks may be at substantially the same height throughout the whole store and far enough above the floor to be entirely out of the way. This is accomplished by providing at the sales-stations a lifting device or elevator upon which the box which is to be sent to the cashier's desk is placed, combined with appliances whereby the box carried upward by the elevator, upon arriving at the said track, is automatically applied thereto and clutched to the cable. The delivery tracks are arranged substantially as shown in the former patent above referred to, starting from a point above the return track and inclining upwardly sufficiently far to cause the grip to engage a projection which disconnects it from the cable, it being necessary of course that the said projection be far enough above the main track to be cleared by boxes passing along and beyond the delivery station at which it is situated. Instead, however, of merely having an open end through which the carrier may be removed, the said track extends downward to a point near the place at which the carrier is placed upon the elevator when it is to be sent to the cashier's desk, and preferably is pro-

vided at its terminus with a pad or buffer, the track being suitably slotted to permit the carrier to be removed as will be hereinafter described. In the construction shown in the said prior patent, moreover, a portion of each track at the receiving and delivery points is shown as cut away so that the carriers may be placed on and delivered from said track, it being necessary for this purpose to provide an opening for the main flanges of said carriers to pass through. The necessary openings are provided as shown therein by cutting away a portion of the upper flanges of each track, and carriers intended to pass by the said stations to points beyond, are retained on the track while passing these openings only by force of gravity, thus rendering it necessary that the track should be substantially horizontal at stations; and further than this, even when the track is horizontal there is liability that a passing carrier may jump up and catch on the end of the track flange where it is cut away.

The present invention aims to obviate this difficulty, the forwarding track being substantially continuous and having its rails or guide ways adapted to spring or spread sufficiently to allow the main flanges of the carriers to pass between them after which they spring back into place. One or both rails of the delivery track are also made substantially continuous by providing a short movable track section pivoted below the end of the delivery track and adapted to be lifted on its pivot by the main flange of the carrier when the said carrier passes into the delivery track, the said main flanges afterward passing out through the end of the movable track section; after which the said track section returns to normal position thus forming a continuous track at that point.

Figure 1 is a side elevation of a portion of the forwarding and return tracks at a station thereof, showing the elevator or lifting device, whereby the carriers are placed upon the forwarding-track, and the delivering-track, over which the boxes are received from the cashier's desk; Fig. 2, a plan view thereof; Fig. 3, an end elevation, on a larger scale, of that portion of the track at which the carriers are applied thereto, the tracks themselves being shown in section on line  $x^3$ , Fig. 1. Fig. 4 is a section on line  $x^4$  of Fig. 3, looking down from the top thereof, showing in plan the main portion of the apparatus whereby the carrier is applied to the track and the apparatus whereby the grip is operated to grip the cable. Fig. 5 is a sectional view on line  $x^5$ , Fig. 1, showing the elevator and terminal portion of the delivery-track in plan view and on the same scale as Figs. 3 and 4; Fig. 6, a sectional view on line  $x^6$ , showing the elevating apparatus mainly in elevation. Fig. 7 is a top plan view, on a larger scale, of that portion of the track where the delivery track begins. Fig. 8 is a section on line  $x^8$ , Fig. 7, looking toward the right, and also showing the carrier in po-

sition to be delivered over the delivery-track. Fig. 9 is a detail showing the movable track-section in side elevation as seen looking from the middle of the track. Fig. 10 is another detail showing the provision for removal of the carrier from the delivery-track after it has been received thereon from the return-track, and Figs. 11 and 12 details showing a modification to be referred to.

Each way or line of transportation comprises two tracks, which are for the most part arranged one above the other, in substantially horizontal position, although the tracks and carriers are so constructed that the carriers will be positively retained in the track whatever may be the position of one relative to the other.

The terms "above" and "below" and "top" and "bottom," &c., will be hereinafter used as applying to the carriers and tracks when in horizontal position with the carriers resting upon the tracks.

The carrier  $a$  may be substantially the same as in my former patent, No. 399,150, the said carrier consisting of a box having laterally projecting ribs or flanges  $a^2$ , along the sides near the bottom, which engage with longitudinal members  $b^2, b^3$ , of the track—one above and one below—so that when the carrier is once placed upon and embraced by the said track it cannot be removed laterally therefrom without a permanent removal of a portion of the tracks themselves or a temporary movement of some portion of the tracks. The tracks are shown in this instance as each comprising two guideways or rails composed of channel-shaped strips  $b$  the edges  $b^2, b^3$ , of which embrace between them the lateral flanges or projections  $a^2$  of the carrier, as described in my former patent.

As shown in Fig. 1 the lower track B is the forwarding track, upon which the carriers are conveyed from the several stations to the cashier's desk, and the upper track  $B^2$  is the return track, upon which the carriers are conveyed back from the cashier's desk each to the station from which it was sent where they are delivered automatically, as will be hereinafter described.

The carriers are propelled along the track by a cord  $e$  running over suitable guides  $C^2$  in the direction indicated by the arrow in the several figures, and when the carriers are applied to the track they have to be connected with said cord by a suitable grip or clutch shown as of substantially the same construction as that represented in my former patent. The said clutch comprises a stationary jaw or member  $f$  projecting downward from the bottom of the carrier and provided near its end with a recess to receive the cord, and a movable member consisting of a finger or projection  $f^3$  at the end of an arm  $f^4$  connected with a rock shaft  $f^5$  having its bearing in the box and being provided with a cam acted upon by a spring (not herein shown), that tends to hold the rock-shaft in either one or two positions,

about a quarter turn apart, as described in said patent. In one of said positions the said clutch member  $f^3$  is close to the member  $f$  and grips the cord, the pull of which tends to turn the movable clutch member in the direction to make it grip more tightly. In the other position the clutch member  $f^3$  is near the edge of the box and remote from the member  $f$  so as not to engage with the cord. (See Figs. 5 and 6.)

The operative relation of the carriers to the track and cable in the present invention differs substantially from that shown in my former patent in that the carriers travel on the forwarding track in inverted position with relation to that in which they travel on the return track, the clutch projecting upward from the bottom of the inverted box while on the forwarding track B, as shown in Fig. 8, and being applied to the track or having its main guide flanges  $a^2$  introduced into the track rails  $b$  of the forwarding track from below instead of from above, as in the construction shown in said former patent. Instead of having one of the longitudinal guide members or flanges  $b^2$ ,  $b^3$ , of one or both of the rails  $b$  of the forwarding track B removed to provide an opening through which the carrier flanges  $a^2$  may be introduced, the said track is so constructed at points where the carriers are to be applied as to be capable of spreading or moving apart sufficiently to allow the flanges  $a^2$  to pass between the adjacent edges of the guide flanges  $b^3$  of the track rails, after which the said rails return to their normal position and embrace the flanges between them. The track rails  $b$  are commonly made of sheet metal and are supported in proper relation to one another by brackets C at suitable intervals along the track, said brackets also having depressions  $C^2$  which support the propelling cord  $e$  so that it runs substantially parallel with the tracks. By leaving a suitable interval between the said brackets C at the points where the carriers are to be applied to the track the said track rails may be forced or spread apart far enough to permit the flanges  $a^2$  of the carriers to pass between the edges of the flanges  $b^3$  of the track rails without permanently bending the said track rails which will spring back into line as soon as the force by which they are spread apart is removed. The said track rails are thus spread or sprung apart automatically by the carrier being applied thereto by the operator, as will be described.

In order to provide for the application of the carriers to the track when the latter is elevated so as to be out of the reach of the operator, a lifting device or elevator is provided which as shown in Fig. 1 consists of a support or car  $g$  adapted to receive the carrier  $a$  upon it, in inverted position, the said support being movable toward and from the track B upon a suitable guide way or elevator track  $g^2$  extending from a point easily accessible to the operator up to the track B and be-

ing connected at its upper end with a bracket or frame  $C^3$  which may be rigidly fastened to the rails of the return track  $B^2$  and is thus held in fixed relation to the tracks so that the carrier when applied to the elevator car  $g$  and moved upward thereby will always engage properly with the rails of the forwarding track B, or with appliances connected with said rails. The said elevator or car  $g$  may be operated in any suitable way being shown in this instance as connected with a cord  $g^3$  passing over a pulley  $g^4$  near the top of the guide  $g^2$  and thence downward so that it can be manipulated by the operator who by pulling down on said cord raises the elevator car and carrier applied thereto up to the level of the track B.

In order to provide for the introduction of the carrier flanges  $a^2$  into the track rails  $b$  when thus lifted to a level thereof, the said track rails are provided with downwardly extending cams or projections  $b^4$  the inner surfaces of which incline downward and outward from the inner edges of the track flanges  $b^3$  as best shown in Fig. 3, so that when the said cam projections are engaged by the flanges  $a^2$  of the carrier in the position shown in full lines Fig. 3, and the carrier is then moved farther upward it crowds the projections  $b^4$  and the track rails  $b$  connected therewith apart as shown in dotted lines until finally the flanges  $a^2$  of the carrier pass the edges of the flanges  $b^3$  of the track rails when the latter spring together and confine the said flanges  $a^2$  within them as shown in Fig. 8, the carrier then being properly applied to the track.

The elasticity of the track rails between the brackets C at the rear and in advance of the point at which the carrier is applied would be sufficient to enable the operation just described to be performed, but in order to afford a better support for the cam projections  $b^4$  and to insure a prompter and more certain spring action, an auxiliary spring may be used, shown as spring arms of a U-shaped piece of metal  $b^5$ , which as shown in this instance extends up over the return track  $B^2$  and has its lower ends connected with the track rails and cam projections  $b^4$ .

It is necessary further, that after the carrier has been properly applied to the track the grip should be caused to engage with the cable  $e$  so that the carrier will be propelled along to its destination. The cable  $e$  as before stated is supported in position substantially parallel with the track by the cord guides  $C^2$  of the track brackets C which latter must be sufficiently large to permit the carrier to run in inverted position on the lower track as shown in Fig. 8, thus normally supporting the cord at a much lower level than that at which it is engaged by the clutch projecting upward from the bottom of the box as shown in Fig. 8. The said cord guiding portions  $C^2$  for the lower track are arranged as shown in Figs. 6 and 8 so that the cord will run in position to be received between the members  $f$ ,  $f^3$ , of the clutch when open, as shown in Fig.

3, the said cord being first engaged by the bottom of the carrier (or a portion of the elevator shelf as shown in Fig. 3) and then raised therewith until the carrier arrives at the proper level to have its flanges received within the track. In this movement, of the carrier from the position shown in Fig. 3, up to the level of the track, the movable member  $f^3$  of the clutch is engaged and acted upon by a cam projection  $f^6$  supported in proper position with relation to the track rail and as herein shown is connected with the track rail and cam projection  $b^4$  by which the latter is operated. By this construction the cam projection  $f^6$  acts with a wedging action to throw the clutch member  $f^3$  toward the co-operating member  $f$  as the carrier comes up into line with the track, and furthermore when the track springs together as the flange of the carrier enters therein, the said projection  $f^6$  has a sudden direct action on the clutch member  $f^3$  thus causing it to close promptly and grip the cord.

In order to insure the lifting of the cord from the bottom of the box so that it will be properly gripped in the recess provided for it near the end of the stationary grip member  $f$  the said stationary grip member is provided with a cam surface  $f^2$  the shape of which is best shown on the carrier on the upper track in Fig. 8 it curving from the base of the carrier toward the end of the jaw  $f$  and thus by the pressure of the jaw  $f^3$  and running movement of the cord itself causing the latter to travel up into the recess at the end of the jaw  $f$  as the jaw  $f^3$  closes upon it.

It is necessary that the carrier should be applied to the elevator with the proper end forward and to insure this, the elevator car may be provided with a guard or projection  $g^6$  which overhangs the bottom of the carrier as shown, permitting the carrier to be applied right end forward as will be understood from Fig. 5, but colliding with the clutch member  $f$  if it should be attempted to apply the box wrong end forward.

The guard  $g^6$  may stand in such position as to engage with the cord  $e$  as the elevator rises as shown in Fig. 3, thus bringing the cord to the proper level for engagement with the clutch members when the clutch is closed by the action of the cam  $f^6$ .

The elevator car is open at its forward end in line with the movement of the carrier on the forwarding track as shown in Fig. 3, so that the instant that the carrier is clutched to the cable as has been described, it is drawn out from the forward end of the elevator car and propelled along the return track.

Any carrier that has been applied to the track at a more remote station and therefore has to pass the appliances just described, for applying the carrier at the station under consideration, will of course have no effect upon the said appliances there being no tendency to spread the track, but in order to guard against damage, in case of a carrier being

propelled past the station with its clutch open (being pushed for example by another carrier properly clutched to the cable  $e$ ) and thus colliding with the cam closing projection  $f^6$  the latter is inclined to the rearward as shown at  $f^7$ , Fig. 4, and would thus act merely to close such clutch without arresting the carrier or causing any damage whatever to the apparatus.

In order to prevent a carrier passing from some more remote station from striking a carrier that is being elevated (or the upwardly projecting clutch thereof) before it is introduced into the track, the elevator car  $g$  is also shown as provided with a guard  $G$ , which may be an upwardly projecting piece rising higher than the clutch members  $f^2, f^3$ , of the carrier on the elevator car as clearly shown in Fig. 3, so that if a carrier from a more remote station should arrive just as the elevator was arriving, at the level of the track, the said carrier would strike against the guard  $G$  and be arrested thereby without striking the clutch members of the carrier on the elevator car, and thus knocking the said carrier off from the said car. The clutch does not engage the cord with sufficient firmness to cause damage in case a carrier gripped to the cord is positively arrested. In such a case the cord will merely slip through the clutch until the carrier thus arrested is released.

The upper surface of the guard  $G$  may be shaped so as to engage the cord if not in proper alignment with the clutch of the carrier and bring it into alignment with said clutch as the elevator rises as will be readily understood from Figs. 3 and 6, in which latter figure the guard is represented as partially broken away in order to show more clearly the clutch members of the carrier on the elevator car.

The bracket or frame piece  $C^3$  by which the elevator track or guide  $g^2$  is connected with the carrier track may merely be widened in its lower part sufficiently to allow the track rails of the lower track to spread as required for the entrance of the carrier flanges  $a^2$ , or the said bracket  $C^3$  may if desired be provided with ears or lugs  $C^4$  as shown in Fig. 6, which prevent vertical springing or displacement of the track rails while permitting them to spring laterally or spread as has been described.

It is obvious that the devices for applying the carrier to the track as has been described do not involve of necessity an elevator or mechanical appliance for presenting the carrier to the cam projections  $b^4$ , &c., as the carrier might be presented by the hand of the operator to the track spreading cams  $b^4$  and clutch closing cam  $f^6$ ; and it furthermore is not essential that the track should be spread to receive the carrier flanges by the direct operation of the latter upon the track rails or projections connected therewith, but such construction is believed to be the most reliable as it causes the tracks to be spread only at

such time and to such extent as is requisite for the proper introduction of the carrier. It is furthermore obvious that it is essential only that one of the guide flanges of each rail, in this instance the lower one  $b^3$ , need be moved laterally in order to permit the introduction of the carrier; but as the entire channel-shaped track can easily spring the required distance it is unnecessary to make the flanges  $b^3$  independently movable, a construction which probably would be less desirable in actual practice.

As shown in Figs. 11 and 12, for example, a portion of the lower flange  $b^3$  is cut away from the track rail and its place taken by a portion  $b^{30}$ , of a movable piece shown in this instance as made of sheet metal having a spring arm  $b^{50}$ , and an inclined projection  $b^{40}$ , which constitutes the cam that is engaged by the carrier flanges  $a^2$ . In normal position the part  $b^{30}$ , constitutes a portion of the lower guide surface or flange  $b^3$  of the track rail which portion is laterally movable or capable of spreading with relation to the corresponding portion of the opposite rail of the track for the purpose of admitting the carrier thereto. In this construction the track rails themselves do not constitute the springs for returning the movable guide portions  $b^{30}$ , to their normal position in which they are substantially continuous with the guide portion  $b^3$  and it is therefore necessary that the spring arms  $b^{50}$ , or their equivalent should be used.

The appliances described are extremely simple and certain in operation, it being necessary only that the operator should place the carrier in proper position on the elevator car and then raise the latter by pulling on the cord  $g^3$  when the carrier will be introduced to the track, clutched to the cable, and instantly started on its way to the cashier's desk, where the appliances for receiving and returning the carrier may be substantially the same as heretofore used in apparatus of this kind, and illustrated in my former patent, No. 399,150, before referred to, or in Patent No. 431,666, dated July 8, 1890, for improvements thereon.

The appliances for delivering the carriers from the return track at the several stations are as follows: Referring to Fig. 1, the delivery track  $n$  is shown as starting at a point somewhat above the main return track  $B^2$ , and the carriers are each provided with auxiliary flanges  $m$  which may be called the delivery flanges, the said delivery flanges being adapted to pass into the open ends of the rails of the delivery track  $n$  which thus guides the carriers from the main track. The open or flange receiving ends of the said delivery tracks are at different distances from the main track at each successive station, while the delivery flanges  $m$  are at different heights from the main flanges  $a^2$  of the carriers in order that each carrier may engage with its own particular delivery track and with no other as is usual in apparatus of this kind.

In order that the carrier may be delivered

at a point readily accessible to the operator the said delivery track after passing upward a sufficient distance to disengage the carrier from the cable by the engagement of the projection  $h^2$  (see Figs. 7 and 8) with the member  $f^3$  of the grip, it turns off laterally as shown in Fig. 2, a sufficient distance to clear the line of the main track and afterward downward to a point near the lower end of the elevator track  $g^2$  and is provided with a pad or buffer  $n^2$  against which the carrier finally stops. In order that the carrier may be easily removed from the said delivery track without necessitating a movement of the buffer, or of any portion of said track, slots  $n^4$  best shown in Fig. 10 are cut in the lower flanges of the tracks the edges of said slots being preferably turned slightly as best shown in Fig. 10 the edge  $n^5$  or one first reached by the carrier, in its downward course being turned inward while the edge  $n^6$  is turned outward. Thus the carrier in moving toward the buffer  $n^2$  will be guided inward by the edge  $n^5$  so that it cannot become accidentally disengaged from the track but when moved by the operator in the opposite direction it can readily be passed out through the said slot as clearly shown in Fig. 10.

The lower end of the delivery track  $n$  may be connected with the lower part of the elevator track  $g^2$  by a bracket or frame piece  $n^7$  as best shown in Fig. 5, affording a space between the buffer  $n^2$  and the elevator track  $g^2$  just sufficient for the elevator car with a carrier properly applied thereto to pass through, so that by having the elevator car arranged to start at the point within or slightly below the frame piece  $n^2$  as shown in dotted lines Fig. 1, it will be necessary for the operator to place the carrier in proper position on the elevator car before the latter can be drawn up to the level of the track, the guard  $g^6$  on the car insuring that the carrier is placed right end forward and the bracket  $n^7$  insuring that the carrier shall be placed fully on the elevator car before the latter, can be effectually operated. The delivery track thus connected with the main track at its upper end and the elevator track at its lower end effectually braces the latter, the three connected tracks making a sufficiently rigid structure for practical operation without requiring additional bracing. The lower end of the elevator track  $g^2$  may if desired be secured to the counter or other fixture and will thus serve as a support for this part of the apparatus.

In order that a substantially continuous track may be afforded for the carriers when being returned from the cashier's desk a movable track section  $p$  best shown in Fig. 9 is provided, the said track section having a pivotal connection  $p^2$  with the main track  $b$  at a point just below the end of the delivery track  $n$ . The said track section is substantially the same as the main track and is supported upon an L-shaped connecting piece  $t$  riveted or otherwise secured at its ends to the outside

of the main track which is broken away for a length sufficient to allow the carrier to be delivered therefrom. The said movable track section  $p$  normally rests as shown in full lines Fig. 9 upon the said connecting piece  $t$  and when in this position forms a continuation of the track past the point at which the carriers are to be delivered, thus affording a continuous track for carriers which are to pass by the particular station at which the said track section is located. When, however, the carrier belonging to this station reaches the delivery track  $n$  the delivery flanges  $m$  of the carrier are engaged by said track so that the said carrier continues up the delivery track, the main flanges  $a^2$  thereof at the same time engaging the track section  $p$  and lifting it to a position substantially parallel with the delivery track, as shown in dotted lines Fig. 9, afterwards passing out through the open ends thereof and allowing the said track section to drop back to its normal position. The said track section may be restored to its normal position by its own weight when the track is horizontal or if desired a spring or other restoring means may be provided as indicated at  $p^3$  Fig. 9, if the track is not in horizontal position.

As shown in the drawings, only one rail of the main track is provided with a movable track section the other side merely having a short portion of its upper guide surface removed so as to afford an opening for the main flange when the carrier leaves the track. It is obvious however, that the movable track section may be applied to both sides if desired, but it is usually sufficient and preferable in practice to provide only one side thereof since this is sufficient in most cases to prevent the carriers from accidentally leaving the track.

I claim—

1. The combination of the carrier and main track therefor composed of two opposite rails or guide ways each having upper and under guide surfaces or flanges that engage corresponding guide surfaces on the carrier above and below, with means for moving portions of the said guide flanges of the track laterally apart from one another sufficiently for the passage of the carrier flanges between them, substantially as described.

2. The combination of the carrier provided with guide flanges; and a main track composed of two opposite rails or guide ways each having upper and under surfaces or flanges that engage the flanges of the carrier; with cam projections adapted to be engaged by the flanges of the carriers to spread portions of the guide surfaces of the rails, substantially as and for the purpose described.

3. The combination of the carrier provided with guide flanges and a cord engaging clutch; and a main track composed of two opposite rails or guide ways each having upper and under surfaces or flanges that engage the flanges of the carrier; and a propelling cord movable parallel with the said track; with

cam projections adapted to be engaged by the flanges of the carriers to spread portions of the guide surfaces of the rails, and a cam projection adapted to engage with and close the clutch, substantially as and for the purpose described.

4. The combination of the carrier and a main track therefor composed of two opposite guide ways, each having upper and under guide surfaces or flanges which engage corresponding guide surfaces upon the carrier above and below; portions of said under guide surfaces being laterally yielding at a point where the carrier is to be applied to the track, cams connected with said yielding portions of said lower guide surfaces, and means for lifting the carrier to a position in which the main flanges of said carrier cooperate with said cams, substantially as described.

5. The combination of the carrier provided with guide flanges and a cord engaging clutch; and a main track composed of two opposite rails or guide ways each having upper and under surfaces or flanges that engage the flanges of the carrier; and a propelling cord movable parallel with said track; with cam projections adapted to be engaged by the flanges of the carriers to spread portions of the guide surfaces of the rails, and a cam projection adapted to engage with and close the clutch, and a lifting device for raising the carrier, substantially as described.

6. The combination of the carrier having laterally projecting flanges and main track therefor composed of two opposite rails or guide ways each having upper and under guide surfaces or flanges that engage said flanges of the carrier above and below, with a lifting device for said carrier and means for moving portions of the said guide flanges of the track for the admission of the carrier flanges substantially as described.

7. The combination of the main track or way having substantially parallel forwarding and return tracks with an elevator track extending from a point below up to the forwarding track and a delivery track extending from the return track to the lower end of the elevator track and serving as a brace therefor, substantially as described.

8. The combination of the main track or way having forwarding and return tracks with an elevator track and car movable thereon adapted to receive a carrier and lift it to said forwarding track and a frame piece as  $n^7$  through which the elevator car and carrier thereon can pass only when said carrier is properly positioned on said elevator car, substantially as described.

9. The combination of the carrier having main guiding flanges and delivery flanges with the main track and delivery track adapted to cooperate with said flanges respectively, the said delivery track having at its terminus a stop or bunter to arrest the carrier and at a short distance therefrom a slot as  $n^4$  through which the delivery flanges

of the carrier may pass to enable said carrier to be removed from said delivery track, substantially as described.

10. The combination with the carrier and  
5 a main track therefor, composed of two opposite guide ways each having upper and under guide surfaces or flanges, which engage corresponding guide surfaces upon the carrier above and below, a delivery track inclined to said main track, and a main track  
10 section normally in line with the main track but movable therefrom into a position substantially parallel with the delivery track, as and for the purpose set forth.

15 11. The combination with the carrier and a main track therefor, composed of two opposite guide ways each having upper and under guide surfaces or flanges which engage  
20 corresponding guide surfaces upon the carrier above and below, of a delivery track and movable section of the main track and support therefor connecting two sections of the main track at a point where the carrier is to  
25 be delivered from the said main track, and a pivotal connection between the said movable track section and its support at the end of the said track section adjacent to the beginning of the delivery track, as set forth.

12. The combination of the carrier provided with a cord engaging clutch and a main track  
30 and propelling cord with an elevator for lifting said carrier and applying it to said track, said elevator being provided with a guard projecting above any portion of the carrier supported thereon, and serving to arrest a  
35 carrier which may be passing on the track and thereby prevent collision between said passing carrier and the one on the elevator, substantially as described.

13. The combination of the carrier provided  
40 with a cord engaging clutch and a main track and propelling cord with an elevator for lifting said carrier and applying it to said track, said elevator being provided with a guard  
45 projecting above the clutch members of the carrier on the elevator and being adapted to guide the cord to a position between said clutch members as the elevator rises, substantially as described.

In testimony whereof I have signed my  
50 name to this specification in the presence of two subscribing witnesses.

JOSEPH C. MARTIN.

Witnesses:

JOS. P. LIVERMORE,  
M. E. HILL.