

Feb. 26, 1935.

M. J. ANDERSON

1,992,687

SELECTIVE DISPATCH AND AUTOMATIC DEFLECTOR CONTROL

Filed Aug. 16, 1930

3 Sheets-Sheet 2

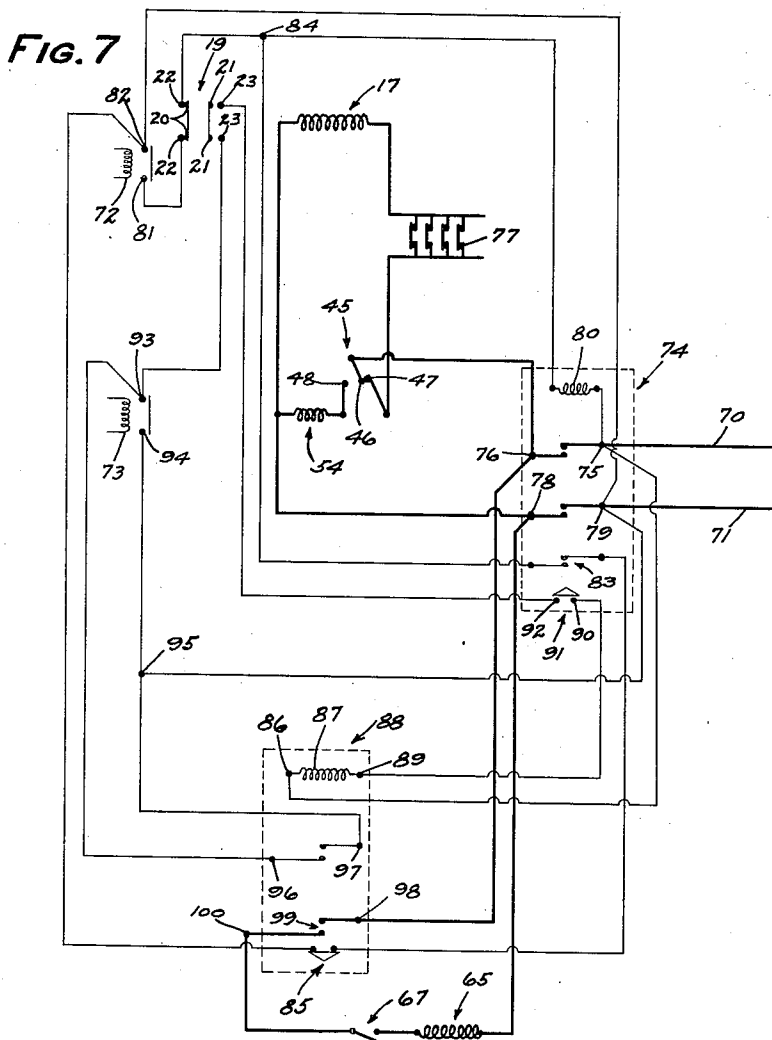


FIG. 3

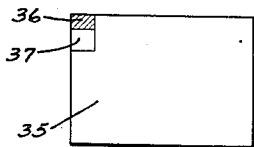


FIG. 5

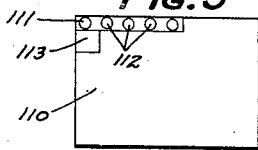


Fig. 4

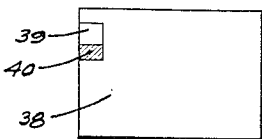
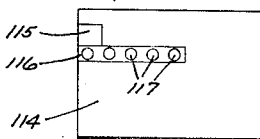


FIG. 6



INVENTOR
MARTIN J. ANDERSON
BY *Paul, Paul Hlbowe*
ATTORNEYS

Feb. 26, 1935.

M. J. ANDERSON

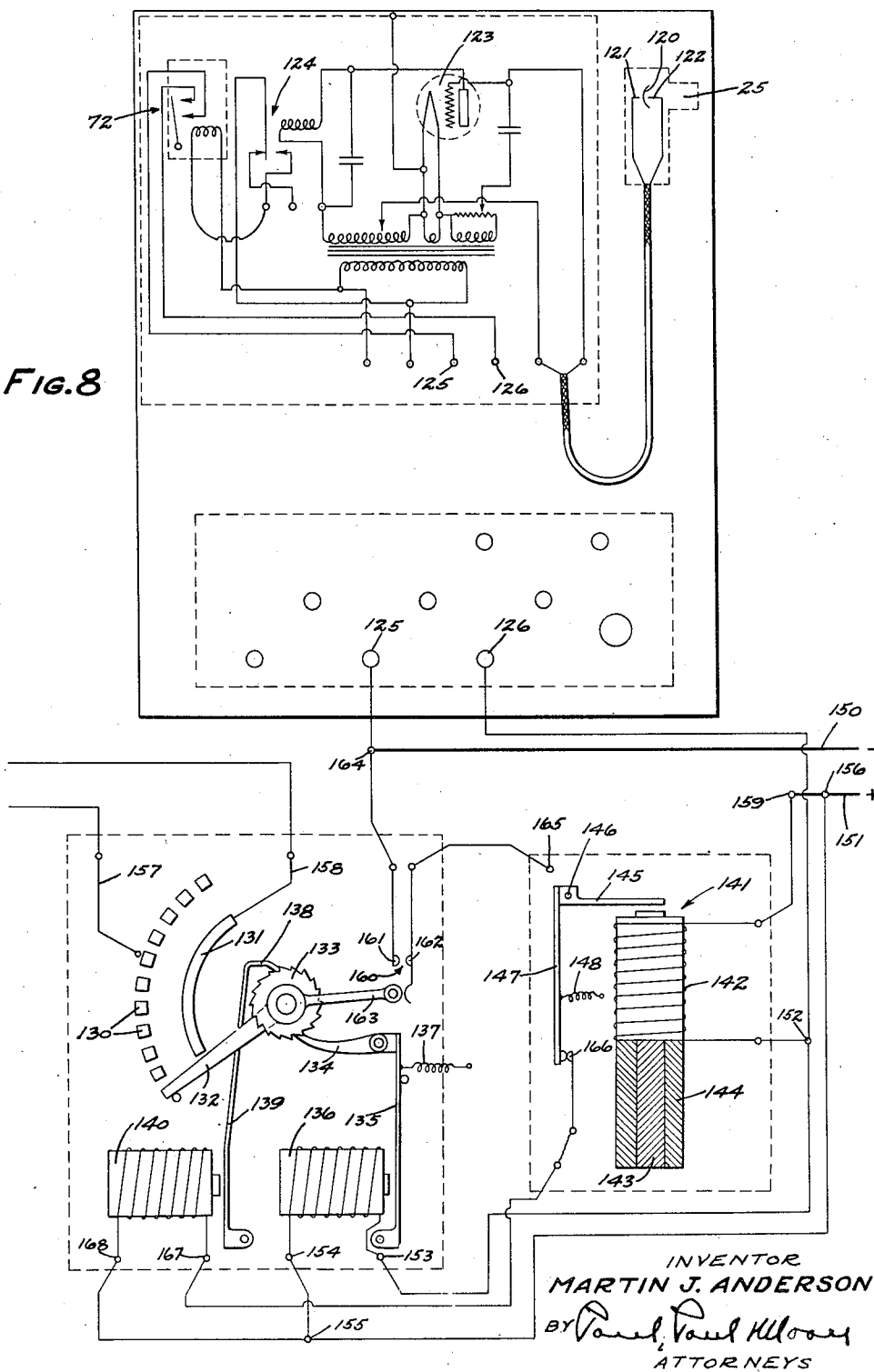
1,992,687

SELECTIVE DISPATCH AND AUTOMATIC DEFLECTOR CONTROL

Filed Aug. 16, 1930

3 Sheets-Sheet 3

FIG. 8



UNITED STATES PATENT OFFICE

1,992,687

SELECTIVE DISPATCH AND AUTOMATIC
DEFLECTOR CONTROL

Martin J. Anderson, Ellwood City, Pa., assignor
to Mathews Conveyor Company, Ellwood City,
Pa., a corporation of Pennsylvania

Application August 16, 1930, Serial No. 475,713

18 Claims. (Cl. 198—38)

This invention relates to a conveying system provided with means for automatically selecting and deflecting commodities from a main conveyor to a selected branch conveyor and presents certain improvements over the structure disclosed in my co-pending application, Serial No. 433,999, filed March 7, 1930.

The primary object of the present invention is to provide a conveying system including means for selectively deflecting commodities from a main conveyor to a branch conveyor, the said means being operated by a single marker or sticker carried by the commodity.

Another object of the invention is to provide a conveying system with deflectors for deflecting commodities from a main conveyor to a selected branch conveyor, the said deflectors being rendered operative or inoperative through the actuation of photo-electric cells responsive to light-reflecting means carried by the commodities to be deflected.

Another object of the invention is to provide a system of the character set forth in which a separate photo-electric cell and amplifying unit is employed to render the deflecting means inoperative.

A further object of the invention is to provide an apparatus as above described in which each deflecting station is provided with a pair of photo-electric cells, one for latching the deflector and the other for unlatching, the said photo-electric cells being mounted at different elevations.

A further object of the invention is to provide a conveying system with deflectors which are rendered operative by a series of electric current impulses produced by the actuation of photo-electric cells.

Still another object of the invention is to provide a system of the character set forth with automatic selector switches responsive to a predetermined number of electric current impulses for actuating a selected deflector.

Other objects of my invention and the advantages thereof will be more fully brought out as the description proceeds.

In the accompanying drawings I have illustrated, by way of example, a practical embodiment of my invention; but it is to be understood that I do not intend to limit myself to the details of construction therein disclosed. It will be readily apparent that the invention is susceptible of embodiment in a variety of forms without sacrificing any of its advantages or departing from the scope thereof as defined in the appended claims.

In these drawings:

Fig. 1 is a plan view of a section of a main conveyor showing a branch conveyor, a deflector in position to deflect commodities to said branch conveyor, and the arrangement of the apparatus for actuating said deflector;

Fig. 2 is a view in side elevation of the structure disclosed in Fig. 1;

Figs. 3 to 6 inclusive are views in side elevation of a commodity showing the light-reflecting means or stickers positioned thereon in a number of different ways;

Fig. 7 is a wiring diagram showing the main and secondary circuits controlling the operation of the deflector and attendant mechanism; and

Fig. 8 is a wiring diagram of a photo-electric cell unit and a selector switch.

I have deemed it unnecessary for the purposes of the present application to disclose in the drawings a complete conveying system. I have, therefore, only shown a section of a main conveyor with a branch conveyor leading therefrom, together with the deflector for deflecting commodities from the main conveyor to the branch conveyor and the mechanisms for actuating the said deflector. It will be understood that a complete system may include a number of main conveyers all leading from a dispatcher's station and that each main conveyor may be provided with a plurality of branch conveyers. At each branch conveyor there will be a deflector and deflector operating mechanism exactly as shown in the present drawings. Therefore, a description of one such unit will serve to make my invention entirely clear. For a disclosure of a complete conveying system, reference is here made to my aforementioned co-pending application.

Referring now to the drawings, the reference numeral 10 indicates a section of a main conveyor which may be of the gravity type or live roller type, or a combination of these.

The reference numeral 11 indicates a branch conveyor leading from the main conveyor 10 and to which commodities may be deflected by means of a deflector indicated by the general reference numeral 12.

The deflector 12 comprises an arm 13 which is secured to a post 14 freely rotatable in anti-friction bearings supported in a part of the framework of the main conveyor. It will be understood that this mounting is such that the deflector will at all times tend to occupy the position in which it is shown in Fig. 1, that is to say, across the main conveyor and in position to deflect commodities to the branch conveyor. For

this purpose the deflector may be over-balanced or suitably weighted, or springs may be provided which will constantly urge the deflector into the position described.

5 When commodities advancing along the main conveyer reach the branch conveyer, the deflector 12 will be swung about its pivotal mounting by the commodities, unless the commodities are to be deflected to the branch conveyer, in
10 which case the deflector will be latched against swinging movement.

The present invention is, as has been indicated, directed to means for latching and unlatching the deflector. Generally speaking this
15 is accomplished through the agency of photo-electric cells which, upon receiving light impulses reflected from the commodities, will complete certain electric circuits for operating the deflector latch.

20 Referring now to Fig. 2, the reference numeral 15 indicates a deflector latch which is mounted upon, or which forms part of, a core 16 of a solenoid 17 secured in a suitable frame 18. The arrangement is such that when the solenoid is energized, the latch 15 will be moved vertically
25 into position in back of the deflector and thus prevent the latter from swinging about its pivot. When the solenoid is deenergized, the latch 15 drops to a position below the deflector thus permitting the latter to be freely swung about its
30 pivot by the commodities advancing along the conveyer to some succeeding station.

The solenoid 17 further actuates a switch 19 comprising movable contact members 20 and 21
35 which make contact with fixed contact points 22 and 23 respectively, for a purpose hereinafter to be fully pointed out.

The circuit for energizing the solenoid 17 to actuate the latch 15 includes a photo-electric
40 cell 25 and an accompanying illuminating device 26 supported on frame work 27. The position of the cell and the illuminating device is clearly indicated in Fig. 2 and is sufficiently in advance of the deflector to assure actuation of the deflector latch before the commodities reach the
45 same.

The solenoid 17 is de-energized by a circuit which includes a photo-electric cell 28 and an accompanying illuminating device 29 mounted
50 upon the frame work 27. Electrical connections 30 and 31 connect the photo-electric cells to amplifying and relaying units inclosed in suitable casings 32 and 33. The amplifying and relay units are identical in operation to similar device described in my aforesaid co-pending application and one such unit will hereinafter be
55 described in detail in connection with a modification of the present system hereinafter referred to as the "impulse system."

60 It is unnecessary for the purposes of the present application to describe in detail the construction and arrangement of the photo-electric cells and the accompanying illuminating device. These structures are fully described in my aforesaid co-pending application to which reference
65 is here made for a complete disclosure thereof. It is sufficient here to state that these cells and illuminating devices may be of any preferred construction and should be so mounted that the
70 illuminating device will cast a concentrated beam of light upon a colored marker or sticker on the commodities which light will be reflected to the photo-electric cells. Suitable color-filters
75 electric cells to increase their efficiency and,

furthermore, the cells may be adjusted to respond only to a selected color.

It is further to be understood that where I herein use the expression "different colors" I do not necessarily mean different fundamental
5 colors; obviously the photo-electric cells may be so adjusted as to respond to different shades of the same color.

The photo-electric cells 25 and 28 are actuated by light reflecting from the commodities to
10 be conveyed and to be deflected in the system. For this purpose the commodities are provided with markers or stickers of a selected color, one color for actuating the photo-electric cell 25 to latch the deflector and the other color for actuating the photo-electric cell 28 for unlatching
15 the deflector. By reference to Fig. 3, the position of the colored marker or sticker with respect to the commodity will be quite clear. In that figure, the reference numeral 35 indicates a commodity which is provided with a colored sticker
20 or marker, the upper section 36 of which will actuate the latching photo-electric cell 25 and the lower section 37 of which will actuate the unlatching photo-electric cell 28.

In the operation of the system, it will be understood that the section 36 of the colored markers or stickers will bear a different color for each
25 deflecting station in the system and each photo-electric cell 25 is so adjusted as to be responsive only to a selected color. The color of the section 37 of the sticker will be the same for all deflecting stations. Hence, all the deflectors
30 will be unlatched when a commodity passes the photo-electric cells 28, except that one deflector the cell 25 of which will respond to the color of the section 36 of the sticker.

It is understood, of course, that each deflecting station will be provided with photo-electric cells
35 25 and 28 similar to those described and that in each instance the unlatching cell 28 is placed in advance of the latching cell 25 and, as disclosed in Fig. 2, at a lower elevation.

To increase the number of deflecting stations in the system the relative position of the latching and unlatching cells may be reversed and the
45 position of the sections of the colored stickers or markers similarly reversed. Thus, in Fig. 4 I have illustrated a commodity 38 bearing a colored sticker the upper section 39 of which will be effective to operate an unlatching photo-electric
50 cell similar to the cell 28 and the lower section 40 operative to actuate a latching photo-electric cell similar to the cell 25.

With the stickers or markers arranged on the commodities in the manner disclosed in Fig. 3,
55 the colored sections 36 might be made in nine different colors thus providing nine deflecting stations in the system. Then, by reversing the position of the stickers as shown in Fig. 4, nine more stations could be added, thus making a total of
60 eighteen deflecting stations possible by the arrangement thus far described.

While I have in the foregoing description used the words "latching" and "unlatching" of the
65 deflectors, it is to be understood that I do not limit myself to the type of deflector which is latched or unlatched. It will be readily apparent that the deflector may be rendered operative to deflect commodities without employing a latch
70 similar to that herein described. For example, the deflector may be constructed to slide across the main conveyer or to move in other ways into deflecting position and to be held in such position
75 without the use of a latch such as the latch 15.

Hence, it may be stated that the function of the photo-electric cells 25 and 28 is to render the deflectors operative or inoperative to transfer commodities from the main conveyer to a branch conveyer.

The deflector is provided with a switch 45 comprising a movable contact 46 carried by the deflector and a pair of relatively fixed contacts 47 and 48, as shown in Fig. 1. The purpose of this switch will presently be pointed out.

With the system, as thus far described, it will be clear that only one colored sticker is required for each consignment of commodities and this sticker will be placed on the first commodity of the consignment. In my aforesaid co-pending application, the system therein described required the placing of a colored sticker on the first and last commodity of each consignment. In the present system the deflector will be latched when the first commodity of a consignment actuates the latching photo-electric cell 25 and the deflector will remain in latched position until the first commodity of a succeeding consignment unlatches the deflector by actuation of an unlatching photo-electric cell 28.

Assuming that a consignment of commodities is passing along the main conveyer to some distant deflecting station beyond that illustrated in the accompanying drawings, it is understood, of course, that such commodities will hold the deflector 12 in its inoperative position. Suppose, then, a consignment of commodities which is to be deflected to the branch conveyer 11 approaches the deflector while it is held open by the commodities of the preceding consignment. It is evident that some means must be provided for retarding the progress of the second consignment until the last commodity of the first consignment shall have cleared the deflector and the deflector has been permitted to swing back to its position across the conveyer before it can be latched in that position. For this purpose, I have provided a stop which consists of a short section of gravity conveyer 50 which is pivoted at 51 to a fixed section 52 and which is provided with suitable counterweights 53 for maintaining the pivoted section 50 in normal elevated position. In order that this pivoted section may function as a stop, it is provided with means for depressing it below its normal elevated position so that commodities advancing along the pivoted section will stop against the adjacent end of the succeeding fixed section of the conveyer. To depress the pivoted section, I have provided a solenoid 54, the core 55 of which is connected, as by a link 56 to the forward end of the pivoted section. When the solenoid 54 is actuated, the core 55 will be drawn downwardly with the result that the pivoted section 50 will swing about the pivot point 51, against the action of the counterweights 53, and thus the forward end of the pivoted section will be below the adjacent end of the next succeeding fixed section. Hence, commodities advancing along said pivoted section will abut against the fixed section and will be thereby prevented from making further progress. The actuation of the solenoid 54 and resultant operation of the pivoted section 50 is such as to retard progress of a succeeding consignment for a time sufficient to permit the deflector 12 to swing back to normal position across the main conveyer. Thereupon, by means fully described in connection with the wiring diagram hereinafter referred to, the pivoted section is restored to its normal elevated

position thus permitting the commodities to continue along the conveyer.

Assuming now that the deflector is latched in the position illustrated in Fig. 1 and is therefore operative to deflect commodities to the branch conveyer 11 and a succeeding consignment of commodities destined to some succeeding station in the system is advancing behind the consignment being deflected. The first commodity of such succeeding consignment will carry a colored sticker which will actuate the unlatching photo-electric cell 28 but if this succeeding commodity is too close to the preceding one, there will not be sufficient time for the unlatching of the deflector. Hence, I have provided means which will retard the progress of the succeeding consignment until the deflector is unlatched. For this purpose, two rollers 60 and 61 are provided with corrugated portions 62 which are adapted to be engaged by a corrugated brake-shoe 63. The brake-shoe 63 is secured to the core 64 of a solenoid 65 mounted on a suitable frame 66. When the solenoid 65 is energized the core 64 will be elevated thus bringing the brake-shoe 63 into engagement with the corrugated sections 62 to stop rotation of the rollers 60 and 61 and hence, to retard the progress of commodities along the conveyer.

The circuit for the solenoid 65 includes a switch 67 which is provided with a movable contact 68 secured to the axis of a roller 69 which is normally held in elevated position with respect to the other rollers of the conveyer, as shown in Fig. 2. When a commodity depresses the roller 69, the switch 67 will be closed, thus completing the circuit for the solenoid 65. The structure thus described is set forth in more detail in my aforesaid co-pending application to which reference is here made.

The operation of the structure described may best be understood when set forth in connection with the wiring diagram illustrated in Fig. 7. In this figure, the reference numerals 70 and 71 indicate incoming power lines. The reference numeral 72 indicates a relay forming part of the amplifying and relay unit 32 which is actuated by the photo-electric cell 25 and the reference numeral 73 indicates a similar relay forming part of the amplifying and relay unit 33 which is actuated by the photo-electric cell 28. The primary circuit, as shown by the heavy lines in this figure, includes a contactor switch 74 and is traced as follows: From 75 through the contactor to 76, through the movable contact 46 of the switch 45, to 47, through suitable line protectors 77, through the solenoid 17, to 78, and back to the line 71 at 79. If the deflector is in open position, the movable contact 46 will make contact with 48, thus modifying the primary circuit as follows: From 75 through the contactor to 76, to 46, to 48, through the solenoid 54, to 78, through the contactor to 79 of the line 71.

The secondary circuit is traced as follows: Beginning at 75 on the incoming line 70 the circuit is through the coil 80 of the contactor switch 74, to the switch 19 which is now closed by the engagement of the contacts 20 and 22 to the relay 72. When the relay 72 is energized the circuit is closed across the same from 81 to 32 and back to the line 71 at the point 79. Thus, the contactor switch 74 is closed, thereby closing, simultaneously, an interlocking switch 83.

It is to be understood that the relay 72 is only momentarily energized when a sticker of the proper color passes the aperture of the photo-electric cell 25 and is immediately deenergized

thereafter. However, the secondary circuit is still intact as follows: From 75 through the coil 80, to 84, through the time interlocking switch 83, to a time interlock switch 85, to 82, and back to line 71 at the point 79. By this arrangement the

contactors of the switch 74 will remain closed until the circuit is open by the time interlock switch 85. With the contactors of the switch 74 closed, the primary circuit is complete through the switch 45 and the solenoid 17 which is to be energized and the deflector is therefore latched in closed position. The deflector will remain latched until it is unlatched by the action of the photo-electric cell 28.

It is to be noted that when the core of the solenoid 17 was moved vertically to position the latch behind the deflector, the contacts 20 and 22 of the switch 19 were opened and the contacts 21 and 23 closed. The contacts 21 and 23 remain closed so long as the deflector is latched and thus so alter the circuit as to permit the unlatching of the deflector several seconds after the relay 73 is actuated. Starting now at point 75 of the incoming line 70 another circuit will be observed from the right of said point to the terminal 86 of the electromagnetic coil 87 of a magnetic switch 88, to a terminal 89 of said coil, to the terminal 90 of a time interlock switch 91, to the terminal 92 of said switch, to the contact 23 of the switch 19 and across said switch to terminal 93 of the relay 73. If now the relay 73 is closed by actuation of the photo-electric cell 28, the circuit will be closed across said relay to 94, to 95, and back to terminal 79 of the incoming line 71. Thus, the circuit is completed through the magnetic coil 87 of the switch 88, energizing the said coil and thus closing the contactors of the said switch when the photo-electric cell 28, which is the unlatching cell, is actuated. The circuit is now complete from 70—75—86—89—90—92—23—93—96—97—95—and back to 79 on the other incoming line 71. This circuit, therefore, holds the contactors of switch 88 in closed position. These contactors will remain closed for several seconds as determined by the setting of the interlocking switch 85 which will open the secondary circuit and de-energize the magnetic coils of switches 88 and 74, thus allowing these switches to drop open.

The foregoing description of the wiring diagram will, it is believed, make clear the operations of latching and unlatching the deflector by the actuation of the photo-electric cells 25 and 28. I will now describe the circuits for operating the pivoted section 50 of gravity conveyer and also the corrugated brake-shoe 63.

If the deflector is held open by a consignment of commodities passing along the conveyer and the first commodity of a succeeding consignment approaches the deflecting station where it is to be deflected, the circuit will be as follows: From 75 on the incoming line 70 through the contactor of the switch 74 to 76, to 46, to 48, through the solenoid 54, to 78, and through the contactor to 79 of the line 71. When now the relay 72 is actuated by colored sticker, the magnetic coil 80 of the switch 74 is energized thus closing the contactors and completing the circuit through the solenoid 54. This solenoid, as hereinbefore explained, operates to depress the pivoted section 50 to such a point that the commodities traveling therealong will abut against the first roller of the adjacent end of the next succeeding fixed section of the conveyer. The commodities will be so held against further movement only long enough to permit

the deflector to swing to its normal position across the conveyer thus breaking the contact at 48 and making contact at 47. Thereupon the circuit is complete through the solenoid 17 which operates the latch.

As has been explained, the corrugated brake-shoe 63 operates to stop rotation of rollers 60 and 61 when a succeeding commodity destined to some distant station approaches the deflector which is held in latched position. The circuit for the solenoid 65 which actuates the corrugated brake-shoe is as follows: From 76 on the line 70, to terminal 98 of a contactor 99 of the switch 88, to the other terminal 100 of said contactor, to the switch 67, through the solenoid 65, back to 78, thence through the contactor to 79 of the line 71. When a sticker of the proper color to actuate the relay 73 passes the aperture of the unlatching photo-electric cell 28 the circuit through the magnetic switch 88 is completed as hereinbefore described. This will close the contactor 99. When now a commodity passes over the floating roller 69 to close the switch 67 the circuit is complete through the solenoid 65 and the corrugated brake-shoe 63 is thereupon actuated. It is understood that the brake-shoe remains in engagement with the rollers until the time-interlock switch 85 opens which, thereupon, allows all the switches to drop open.

As a further modification and to add to the system still a greater number of deflecting stations I may employ what I shall herein refer to as an "impulse system". That is to say, the relay 72 for latching the deflector will operate not by a single current impulse produced by a marker or sticker of a selected color, but, on the other hand, by a series of impulses produced by a series of similarly colored markers or a series of spots of the same color on a single marker. In Figs. 5 and 6 I have illustrated a commodity bearing stickers of the type just referred to for imparting a plurality of light impulses which will be converted into electrical current impulses for actuating the relay 72. In Fig. 5 the commodity is designated by the reference character 110 which is provided with a latching sticker or marker 111 provided with a plurality of spots 112 suitably spaced thereon and all of the same color. The reference character 113 indicates an unlatching sticker or marker which, as in the case of the embodiments heretofore described, will be of the same color for all the deflecting stations. The number of spots 112 will be determined with reference to the station to which it is desired that the commodities bearing the sticker shall be conveyed. For example, the system may include five deflecting stations, each operated by a different number of electric current impulses. Thus, station No. 1 would be operated by five impulses; station No. 2 by four impulses; station No. 3 by three impulses, etc.

Further to increase the number of deflecting stations in the system, the stickers or markers shown in Fig. 5 may be reversed so as to occupy the position shown in Fig. 6. In this latter figure, the reference numeral 114 indicates a commodity which carries an unlatching sticker or marker 115. The reference character 116 indicates a latching sticker or marker which is provided with a plurality of light reflecting spots 117. With the stickers arranged as in Fig. 5 it is understood that the unlatching photo-electric cells will be positioned at an elevation below that of the latching photo-electric cell; whereas, with the stickers arranged as in Fig. 6 the unlatching

photo-electric cells will be positioned at an elevation above that of the latching photo-electric cell.

It is possible further to add to the number of deflecting stations by varying the colors of the light reflecting spots on the stickers 111 and 116. Thus, a series of five stations may be operated when the light reflecting stops on the stickers 111 and 116 are all red, a second set of five stations could be operated when these spots are all of the color blue, and so on.

Considering now the commodities with stickers arranged as in Fig. 3 and assuming that nine different colors, or shades of different colors might be used for the stickers 36, then nine deflecting stations might be operated by so arranging the stickers. By reversing the stickers, as shown in Fig. 4, another series of nine stations could be added to the system. Then, by incorporating the impulse system, with the stickers arranged as in Fig. 5, five more stations could be added; and by reversing the arrangement of the stickers, as shown in Fig. 6, five more deflecting stations could be added to the system. It is further possible, as above pointed out to add stations by changing the color of the light reflecting spots on the stickers as shown in Figs. 5 and 6. Thus, it will be seen that a system of conveying and deflecting commodities as herein set forth is exceedingly flexible and consequently may be installed whether the required number of deflecting stations be very small or relatively large.

The impulse system may best be understood by reference to Fig. 8 in which I have shown, diagrammatically, an amplifying and relaying unit similar to the unit 32, hereinbefore referred to, in combination with a selector switch which operates to close the circuit across the terminals 81 and 82 of Fig. 7. Referring to Fig. 8, the reference numeral 25 indicates the latching photo-electric cell, which includes a light-sensitive element 120. When light shines upon this element a flow of electrons takes place between the electrodes 121 and 122, thus closing the gap between these electrodes and causing a minute flow of current thereacross. This current is amplified by means of a pilotron tube 123 which amplifies this minute current and renders it useful. A sensitive relay 124 is incorporated in the circuit and acts to close the relay 72 from which connections are made to terminals 125 and 126 on a suitable terminal board. The construction and operation of the unit thus described is more fully set forth in my aforesaid co-pending application to which reference is here made for a more detailed description thereof. It is believed sufficient for the present purposes to say that actuation of the photo-electric cell by light impinging thereon closes the relay 72 which in turn actuates a selector switch now to be described.

The selector switch includes a series of contact points 130 and a continuous contact member 131. A wiper contact 132 is employed for electrically connecting the continuous contact 131 with a selected one of the contact points 130. The arrangement shown in Fig. 8 is such that the outgoing line is connected to the sixth contact point of the series 130 and consequently the wiper 132 will have to be moved to position where it will bridge the space between the continuous contact 131 and this one contact point of the series 130.

Movement of the wiper 132 is effected through a ratchet 133 which is rotated, step by step, by a pawl 134 secured to the armature 135 of a magnetic coil 136. The arrangement is such that

when the magnetic coil is energized the armature will be attracted and thus cause movement of the pawl 134 with a consequent rotation of the ratchet 133 one step in a clockwise direction. The armature 135 is normally held away from the core of the magnetic coil 136 by a suitable spring 137.

The ratchet 133 is held in any position to which it is rotated by a dog or detent 138 formed on the armature 139 of a second magnetic coil 140. This arrangement is such that when the magnetic coil 140 is energized it will attract the armature 139 and thus withdraw the dog or detent 138 from its engagement with the ratchet 133. Thereupon the ratchet 133 is restored to its initial position through the action of a spring (not shown) against which it was rotated.

The electric circuit for energizing the magnetic coil 140 is completed through the action of a slow-to-release relay designated by the general reference numeral 141. This relay comprises a magnetic coil 142 having a core 143, the lower part of which is surrounded by a sleeve or bushing 144 of commercially pure copper. An armature 145 is pivoted at 146 and is provided with a contact arm 147 provided with a pull spring 148 which tends to keep the armature 145 out of contact with the core of the coil 142. The action of the slow-to-release relay above described is such that the armature remains attracted to the core for a predetermined time after the coil 142 has been de-energized by the breaking of the electric circuit, thus delaying for the selected period of time the contact made by the arm 147, as will be more fully described when the circuits are traced.

Referring now to the wiring diagram illustrated in Fig. 8, the incoming lines 150 and 151 are connected to a source of potential. In the case shown, D. C. is used; but it is to be understood that A. C. may be used by suitably altering the type of apparatus employed. As the photo-electric cell 25 is actuated by a reflecting spot, the contacts of the relay 72 are momentarily closed, thus closing a circuit from the line 150 to the terminal 125 and through the contacts of relay 72 to the terminal 126.

Starting now with the terminal 126, the circuit will be complete through terminal 152, to 153, through the winding of the magnetic coil 136, to terminal 154, to terminal 155, and back to terminal 156 of the line 151. Therefore, the magnetic coil 136 will be energized and will attract the armature 135 which will cause rotation of the ratchet 133 one step in a clockwise direction and thereby moving the wiper 132 from its initial position to the first of the series of the contact points 130. This same cycle will be repeated each time a reflecting spot on the stickers passes the photo-cell 25. In the present case the outgoing line 157 is connected to the sixth of the series of contact points 130 and the outgoing line 158 is connected to the continuous contact 131. Hence, when the wiper has been moved to a position where it establishes contact between the member 131 and the sixth of the series of contacts 130, the circuit will be closed thereacross, as will be readily understood. It will require six reflecting spots on the stickers to move the wiper 132 to the last-mentioned position.

The winding of the magnetic coil of the slow-to-release relay 141 connects with the line 151 at 159 and with the other line 150, at the terminal 152. Hence, it will be obvious that when

the magnetic coil 136 is energized, the coil 142 of the relay will also be energized.

The reference numeral 160 indicates a contactor comprising contact points 161 and 162 which are normally held open by a member 163 attached to and movable with the wiper 132. As the wiper is rotated the member 163 is also rotated thus permitting closing of the contacts 161 and 162. Thereupon another circuit is closed as follows: From terminal 164 on the line 150, through the contact 161, to 162, to terminal 165 connected to the member 147. Since the coil 142 of the slow-to-release relay is energized, the armature 145 is attracted to the core of the said coil and will remain so attracted for a period of one second after the coil has been deenergized, this result being obtained by means of the copper sleeve surrounding the core of the coil. Now, when the armature 146 is released, the member 147 will make contact with the contact point 166 thus completing the circuit to the terminal 167 of the magnetic coil 140, through the winding of the said coil to the terminal 168 and back to the line 151 at the terminal 156. Thus, the magnetic coil 140 will be energized, attracting the armature 139 and thereby withdrawing the dog or detent 138 from engagement with the ratchet 133 and permitting the latter to return to its initial position, as hereinbefore described.

It is understood that the slow-to-release relay 141 is set to operate one second after the circuit has been broken. Therefore, if the time interval between reflecting spots on the stickers is equal to the time required for the magnetic coil of the relay 141 to release the armature 145, the magnetic coil 140 will be energized to release the ratchet wheel and thereby permit the wiper 132 to return to its initial position. Hence, the time interval between reflecting spots on the stickers must be a little less than one second. This, however, is sufficient time as the selector switch is destined to operate at a speed of ten impulses per second.

While I have in the foregoing description referred to the actuation of the deflector of a single deflecting station, it will be understood that in actual practice, a plurality of deflecting stations will be provided, each having a deflector and actuating mechanism as heretofore described. Thus, with the impulse system there will be a selector switch at each deflecting station which will be actuated by a predetermined number of electric current impulses. Each deflecting station, whether the impulse system or the system employing different colored stickers is used, will include a photo-electric cell for rendering the deflector at the station operative and a second photo-electric cell for rendering the deflector inoperative. With each system the unlatching photo-electric cell will operate in the same manner, that is to say, through the actuation of a single marker of a color common to all the stations in the system.

As a further modification, and to increase the numbers of deflecting stations in the system, the colored stickers or markers may be placed at different elevations on the commodities. For example, a colored sticker such as that illustrated in Fig. 3 can be placed on the commodity in a position below that which it occupies in Fig. 3. It follows that an additional set of stations could then be provided each having a latching and an unlatching photo-electric cell positioned to respond to the colored sticker at such lowered elevation. In so enlarging the system it will be necessary to add a second unlatching cell similar to

the cell 28 to each station preceding the added set of stations so that such cell will respond to the unlatching portion of the sticker when placed in the lowered position on the commodity, as above described. The two (or more) unlatching photo-electric cells would be connected in parallel so that actuation of either of them would operate a relay similar to the relay 73.

Other modifications will readily suggest themselves to those skilled in the art without departing from the scope of the invention as defined in the following claims.

I claim as my invention:

1. In a conveying system, a main conveyer, a branch conveyer leading therefrom, means for transferring commodities from said main conveyer to said branch conveyer, and means for actuating said transferring means, said actuating means comprising a pair of photo-electric cells positioned at relatively different elevations with respect to said conveyers, one of said photo-electric cells being actuatable to render said transferring means operative and the other to render said transferring means inoperative.

2. In a conveying system, a main conveyer, a branch conveyer leading therefrom, means for transferring commodities from said main conveyer to said branch conveyer, and means for actuating said transferring means, said actuating means comprising a pair of photo-electric cells positioned at relatively different elevations with respect to said conveyers, one of said photo-electric cells being actuatable to render said transferring means operative and the other to render said transferring means inoperative, and means carried by the commodities and positioned to align with said photo-electric cells for actuating said cells.

3. In a conveying system, a main conveyer, a plurality of branch conveyers leading therefrom, means for transferring commodities from said main conveyer to said branch conveyers, and means for actuating a selected transferring means, said actuating means comprising a pair of photo-electric cells responsive to different colors for rendering the selected transferring means operative and inoperative.

4. In a conveying system, a main conveyer, a plurality of branch conveyers leading therefrom, means for transferring commodities from said main conveyer to said branch conveyers, and means for actuating a selected transferring means, said actuating means comprising a pair of photo-electric cells responsive to different colors for rendering the selected transferring means operative and inoperative, and means of different colors carried by the commodities for actuating said photo-electric cells.

5. In a conveying system, a main conveyer, a plurality of branch conveyers leading therefrom, means at each branch conveyer for transferring commodities thereto from said main conveyer, and means for actuating said transferring means, said actuating means comprising a pair of photo-electric cells at each branch conveyer, one of the cells of each pair being responsive to a selected color for rendering a selected transferring means operative and the other cell of said pairs being responsive to a common color for rendering all of said transferring means inoperative.

6. In a conveying system, a main conveyer, a plurality of branch conveyers leading therefrom, means at each branch conveyer for transferring commodities thereto from said main conveyer, and means for actuating said transferring means,

said actuating means comprising a pair of photo-electric cells at each branch conveyor, one of the cells of each pair being responsive to a selected color for rendering a selected transferring means operative and the other cell of said pairs being responsive to a common color for rendering all of said transferring means inoperative, and means carried by the first commodity of a consignment for actuating said photo-electric cells.

7. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, means at each branch conveyor for transferring commodities thereto from said main conveyor, and means for actuating said transferring means, said actuating means comprising a pair of photo-electric cells at each branch conveyor, one cell of each pair being actuable to render its associated transferring means operative and the other to render it inoperative, and means carried by the commodities for actuating one of said cells to render a selected transferring means operative and means also carried by the commodities for actuating certain others of said cells for rendering all the other transferring means inoperative.

8. In a conveying system, a main conveyor, a branch conveyor leading therefrom, normally inoperative means for transferring commodities from said main conveyor to said branch conveyor, means actuated by a plurality of electric current impulses for rendering said transferring means operative, and means actuated by a single electric current impulse for rendering said transferring means inoperative.

9. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, normally inoperative means for transferring commodities from said main conveyor to said branch conveyers, and photo-electrically operated means actuable by a predetermined number of electric current impulses for rendering a selected transferring means operative.

10. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, normally inoperative means for transferring commodities from said main conveyor to said branch conveyers, photo-electrically operated means actuable by a predetermined number of electric current impulses for rendering a selected transferring means operative, and photo-electrically operated means actuable by a single electric current impulse for rendering said transferring means inoperative.

11. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, normally inoperative means for transferring commodities from said main conveyor to said branch conveyers, photo-electrically operated means actuable by a predetermined number of electric current impulses for rendering a selected transferring means operative, and means carried by the commodities for actuating said photo-electrically operated means.

12. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, normally inoperative means for transferring commodities from said main conveyor to said branch conveyers, photo-electrically operated means actuable by a predetermined number of electric current impulses for rendering a selected transferring means operative, photo-electrically operated means actuable by a single electric current impulse for rendering said transferring means inoperative, and means carried by the commodi-

ties for actuating said photo-electrically operated means.

13. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, means for transferring commodities from said main conveyor to said branch conveyers, and means for actuating said transferring means, said actuating means comprising a pair of photo-electric cells at each branch conveyor, one cell of each pair being actuable to produce a predetermined number of electric current impulses for rendering a selected transferring means operative, and the other cell being actuable to produce a single electric current impulse for rendering said transferring means inoperative.

14. In a conveying system, a main conveyor, a plurality of branch conveyers leading therefrom, means for transferring commodities from said main conveyor to said branch conveyers, and means for actuating said transferring means, said actuating means comprising a pair of photo-electric cells at each branch conveyor, one cell of each pair being actuable to produce a predetermined number of electric current impulses for rendering a selected transferring means operative, and the other cell being actuable to produce a single electric current impulse for rendering said transferring means inoperative, and means carried by the commodities for imparting to the first-mentioned cell a predetermined number of light impulses and for imparting a single light impulse to the second-mentioned cell.

15. In a conveying system, a main conveyor, branch conveyers leading therefrom, means for transferring commodities from said main conveyor to said branch conveyers, a photo-electric cell at each branch conveyor, means for imparting a plurality of light impulses to said cell, and a selector switch associated with said cell and said transferring means and actuable by a predetermined number of electric current impulses to render its associated transferring means operative.

16. In a conveying system, a main conveyor, branch conveyers leading therefrom, means for transferring commodities from said main conveyor to said branch conveyers, a photo-electric cell at each branch conveyor, means for imparting a plurality of light impulses to said cell, a selector switch associated with said cell and said transferring means and actuable by a predetermined number of electric current impulses to render its associated transferring means operative, and a second photo-electric cell at each branch conveyor for rendering said transferring means inoperative.

17. In a conveying system, a main conveyor, branch conveyers leading therefrom, means for transferring commodities from said main conveyor to said branch conveyor, and means for actuating a selected transferring means, said actuating means including a photo-electric cell, means for imparting a plurality of light impulses to said cell, means for converting said light impulses to electric current impulses, and a selector switch associated with said cell and said transferring means and actuable by a predetermined number of electric current impulses to render its associated transferring means operative.

18. In a conveying system, a main conveyor, branch conveyers leading therefrom, means for transferring commodities from said main conveyor to said branch conveyor, and means for actuating a selected transferring means, said actu-

ating means including a photo-electric cell, means of electric current impulses to render its associated transferring means operative, and a second photo-electric cell at each branch conveyer responsive to a single light impulse for rendering said transferring means inoperative.

5 means and actuatable by a predetermined number

MARTIN J. ANDERSON.

5