

April 28, 1953

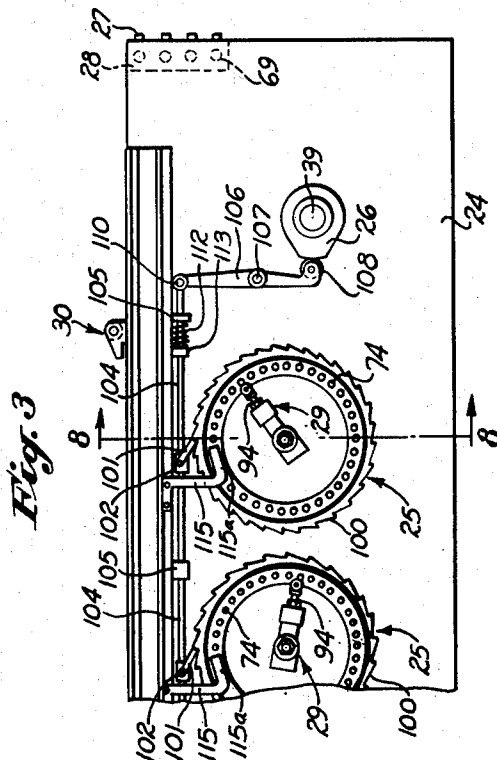
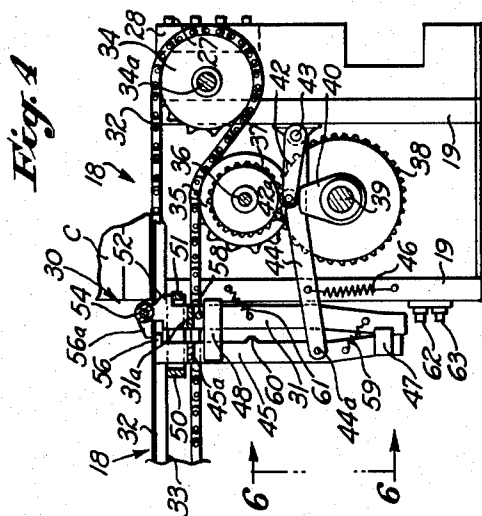
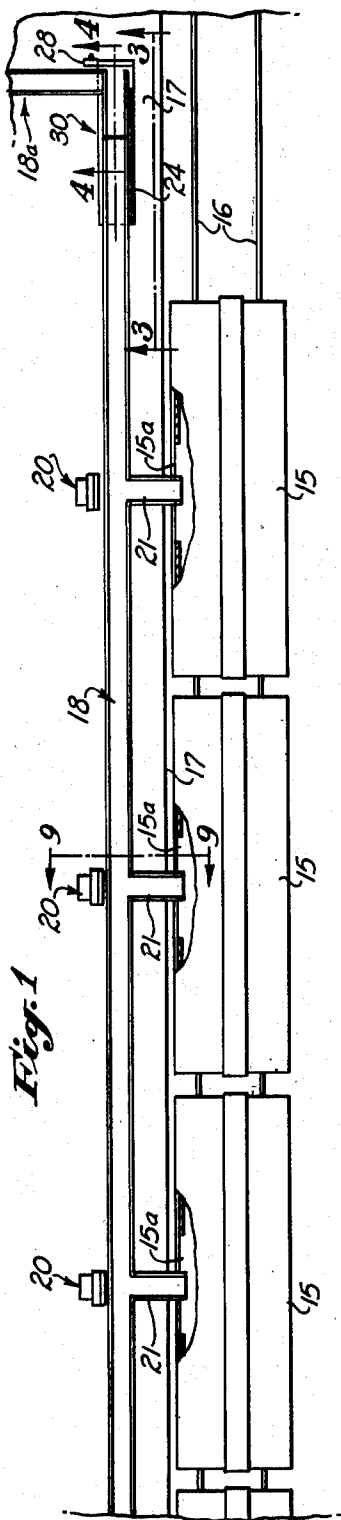
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2,636,622

AUTOMATIC CAR LOADING CONVEYER SYSTEM

Filed Aug. 18, 1947

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

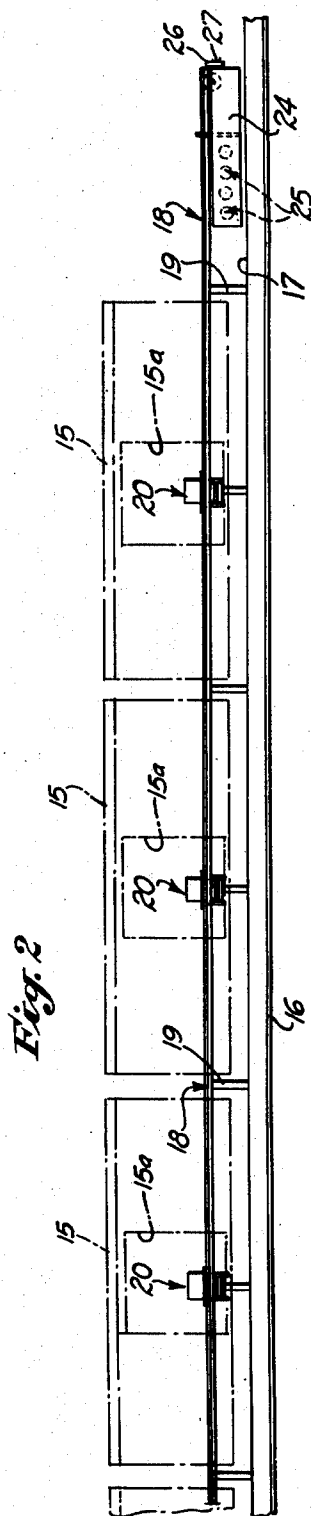


Fig. 1

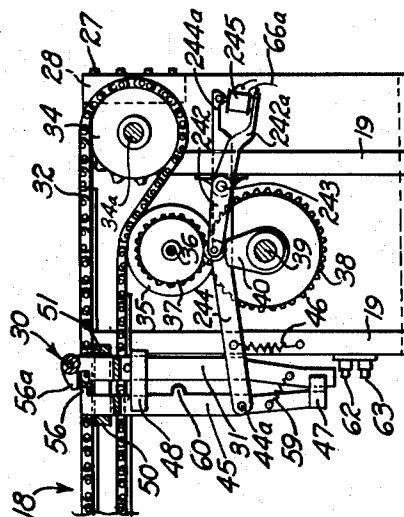


Fig. 6

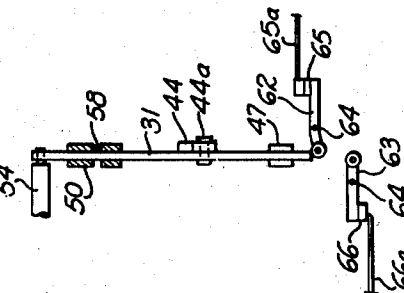
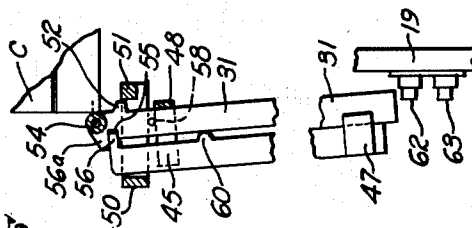


Fig. 5



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UNITED STATES PATENT OFFICE

2,636,622

AUTOMATIC CAR LOADING CONVEYER
SYSTEM

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Application August 18, 1947, Serial No. 769,175

9 Claims. (Cl. 214-11)

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This invention relates to apparatus for loading crates and similar packages into railroad cars.

A principal object of the invention is to provide apparatus of the indicated nature which may be operated continuously and will automatically and selectively discharge crates and the like from an advancing conveyor moving past several freight cars.

A further object of the invention is to provide electrically controlled apparatus through the medium of which an operator may select a car into which any given crate or package is to be discharged, it being necessary merely to push a selected circuit controlling button in order to produce the desired effect.

Another object of the present invention is to provide a structure in which a crate or similar package travelling on a conveyor will itself co-operate in effecting discharge of the respective package or crate into the freight car for which it is intended, and an incidental object is to rely upon the crate or other package to control the setting up of selective mechanism through which the crate is eventually discharged into the respective car.

In the accompanying drawings:

Fig. 1 is a plan view illustrating somewhat diagrammatically the arrangement of conveyor mechanism constructed in accordance with this invention, such mechanism being shown in operative relation to a plurality of freight cars to be loaded;

Fig. 2 is a side elevation illustrating somewhat diagrammatically the arrangement shown in Fig. 1;

Fig. 3 is a side elevation of selector-wheel apparatus used for selecting the respective stations and through which automatic ejection at the respective stations is effected, the view being taken from the line 3-3 of Fig. 1;

Fig. 4 is a fragmentary vertical section taken from the line 4-4 of Fig. 1, and showing intermittently operating automatic tripping mechanism through which selector means on the respective selector-wheels are actuated;

Fig. 5 is a fragmentary view, on an enlarged scale, corresponding with a portion of Fig. 4 and illustrating a succeeding step in the operation;

Fig. 6 is a fragmentary view taken approximately from the line 6-6 of Fig. 4 and illustrating also a later stage of operation beyond that indicated in Fig. 5;

Fig. 7 is a side elevation similar to that of Fig. 4 and showing a slightly modified form of construction;

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Fig. 8 is a vertical cross section taken on the line 8-8 of Fig. 3 and showing on an enlarged scale the construction of the selector-wheels and associated selecting mechanism;

Fig. 9 is a vertical cross-section through the conveyor and its support, adjacent one of the stations, and illustrating the means for ejecting a package at the respective station;

Fig. 10 is an elevation of the face of the switch box carrying the push buttons and illustrating means for retaining the respective buttons in depressed condition when it is desired to unload all of a considerable quantity of crates or packages being handled into a given freight car; and

Fig. 11 is a wiring diagram of circuits which may be employed to effect control through the mechanism illustrated.

As illustrated in Figs. 1 and 2, a string of railroad freight cars 15 is spotted on rails 16 alongside a loading dock 17 at the opposite side of which an elongated continuously operating conveyor structure, generally indicated at 18, is disposed, the conveyor structure being carried upon appropriate supporting standards 19 (Fig. 4). Located at appropriately spaced points along the conveyor structure 18, to correspond with the spacing of the freight cars 15, is a plurality of discharge devices or ejectors generally indicated at 20 and adapted for pushing off crates or other packages from the conveyor structure 18 onto laterally extending conventional discharge conveyors 21 adapted to enter doorways 15a of the respective freight cars 15. These ejectors 20, which are fully disclosed in Fig. 9, are located along the conveyor structure at such distances as desired to conform with the spotting of the freight cars 15, the control mechanism employed being adapted to be adjusted in accordance with the car spacing.

At the forward end of the conveyor structure 18, which is the right end as seen in Figs. 1 and 2, a lateral feed conveyor 18a is provided, and adjacent supporting standards 19 on the near side of the structure carry an elongated upstanding panel 24 upon the outer face of which there is positioned a plurality of toothed selector-wheels 25 and associated actuating and setting mechanism. The number of selector-wheels 25 will conform with the maximum number of cars to be loaded at any one time, and these selector-wheels will be advanced step by step as a unit by means of a cam 26 (Fig. 3) and other mechanism presently to be described. On the front end of the conveyor structure a plurality of push buttons 27 is provided in a switch box 28, there

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being a button 27 to correspond with each selector-wheel 25, and there being an adjustable switch 29 cooperating with each selector-wheel 25 whereby to control the respective discharge devices or ejectors 28, as also hereinafter described. The selector-wheels 25 and the switch devices 29 function also as timing or measuring devices whereby crates or other packages on the conveyor are respectively discharged after they have travelled respective predetermined distances 10 from the starting point.

In a position disposed slightly beyond the push buttons 27 and the switch box 29, which is the mentioned starting point, there is provided a trip mechanism generally indicated at 30 and 15 including a cross-frame 31 adapted to be controlled by a crate C (Fig. 4), or similar package, carried upon advancing endless conveyor chains 32 which are driven by any appropriate power means, not shown, and preferably located at the opposite end of the conveyor structure. These 20 conveyor chains 32, which include smooth links according to a conventional construction, travel in appropriate channel guides 33 extending longitudinally of the structure 10, the chains 32 passing around sprockets 34 and 35 (Fig. 4). The sprockets 34 are appropriately journaled by means of a shaft 34a, and the sprockets 35 are carried upon a shaft 36, the sprockets 35 being 25 fixedly connected with gears 37 which mesh with gears 38 fixed upon a shaft 39 appropriately journaled in adjacent parts of the framework, such shaft 39 having cams 40 fixed thereon and also having the previously mentioned cam 26 fixed thereon.

The cams 40 actuate bell cranks which control the trip mechanism 30, each bell crank comprising a short arm 42 whose free end is provided with a roller 42a engaged by the cam 40, and whose opposite end is fixed upon a rock shaft 43 journaled on an adjacent supporting standard 19. Each bell crank also has an elongated arm 44, one end of which is fixed to the rock shaft 43 and the other end of which is attached by a pivot 44a to an adjacent vertical side member 45 of two such members which are spaced and constitute a transverse frame forming a portion of the tripping mechanism 30. A crossbar 45a connects the members 45. Springs 46 have their upper ends attached to the respective bell crank arms 44, their lower ends being attached to adjacent standards 19 whereby normally to urge the arms 44 and the frame members 45 to their lowermost positions. Thus, the position of the oscillating ends of the crank arms 44 determines the position of the side members 45 of the corresponding vertical frame, such position being in turn controlled by the cams 40 and the crank arms 42. The vertical side members 45 cooperate with the frame 31 which is in turn composed of two vertical side members in the form of bars connected by a crossbar 31a and guided between lower guide straps 47 on the lower ends of the side members 45 and upper guide straps 48 adjacent the upper ends of the side members 45 and below the crossbars 31a and 45a, the guide straps 47 and 48 being disposed horizontally in such position as to engage the sides of the respective side members of the frame 31; see Figs. 4 and 6. The backs of the upper ends of the vertical side members 45 are limited against rearward movement by a crossbar 50, and the forward edges of the upper ends of the side members of the frame 31 are limited against forward movement by a crossbar 51, the upper face of the 75

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crossbar 51 also serving as a support or retainer for the frame 31 by reason of being engaged by horizontal under faces of adjacent lugs 52 carried on the forward edges of the members of the frame 31. Thus, when the frame 31 is in an elevated inoperative position it is supported through the medium of the lugs 52 by the crossbar 51. The crossbars 50 and 51 are carried by the main frame of the apparatus. As seen in Fig. 4, the upper edges of the lugs 52 are beveled to permit ready return of the frame 31 to its elevated position.

The frame 31 of the trip mechanism 30 is adapted to be dislodged from its support position, shown in Fig. 4, through engagement of a crate C with a transverse roller 54 carried between the upper ends of the side members of the frame 31, the frame 31 thus being moved to a position to disengage the lugs 52 as illustrated in Fig. 5. When such movement is effected, the upper extremities of the side members of the frame 31 are moved rearward so that notches 55 in such side members receive fingers 56 projecting forward from the upper extremities of the side members 45, upon elevation of the members 45. Meanwhile, the smooth-linked conveyor chains 32 slide under the crate C. Upon descent of the side members 45, through the medium of the crank arms 44 under the influence of the springs 46 as the crank rollers 42a on the crank arms 42 are relieved by the cams 40, the frame 31 is moved downward by reason of the mentioned engagement of the fingers 56 in the notches 55, thereby withdrawing the roller 54 and releasing 35 the crate C. Similarly, the frame 31 is subsequently moved upward by the cams 40 and by the fingers 56, thereby again to dispose the roller 54 in the path of any oncoming crate. If desired, pins 58 (Fig. 6) may be additionally provided in the side members of the frame 31 for lifting and supporting engagement thereof by the upper guide straps 48 on the side members 45.

For the purpose of causing the lugs 52 of the frame 31 to return to their inoperative supported position upon the crossbar 51 when the parts have been restored to the elevated position as shown in Fig. 4, so that no excursion of the frame 31 will occur when there is no crate in position, appropriate spring means may be employed. For example, springs 59 may connect the lower ends of the members of the frame 31 and the side members 45, whereby to pull the lower ends of the frame members toward said side members 45 and cause the upper ends thereof to tend to separate by rocking of the members of the frame 31 about lugs 60 carried on the forward edges of the vertical side members 45. In addition, springs 61 may be used, if desired, to tend to pull forward the upper ends of the members of the frame 31, such springs 61 having their ends respectively attached to the members of the frame 31 and to the adjacent standards 19. Thus, when the frame 31 has been elevated so that the lugs 52 lie above the crossbar 51, such lugs 52 are drawn into position to be supported upon the crossbar 51. On the other hand, when the crate C pushes the upper portion of the frame 31 rearward to cause the notches 55 in the members 31 to engage about the fingers 56 on the upper ends of the side members 45, the springs 59 and 61 are correspondingly expanded. These relative positions are illustrated in Figs. 4 and 5. For the purpose of causing the fingers 56 to actuate positively to elevate the frame 31, the upper ends of the members of 75

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the frame 31 are provided with overhanging nose pieces 56a against which the fingers 56 engage as the side members 45 are elevated by the bell cranks 42, 44.

The object of the vertical movement downward of the frame 31, when its upper end is engaged by a crate C, is to actuate electric circuit-making and breaking devices for energizing and denenergizing the various circuits which are employed in the system, and are hereinafter to be described, so that electrically controlled devices may operate as required. Therefore, the lower end of one of the side members of the frame 31 is caused to engage and operate successively an upper switch arm 62 and a lower switch arm 63, Figs. 4, 5, 6 and 11. As indicated in Fig. 6, the two switch arms 62 and 63 may be pivoted at 64. As the lower end of the mentioned member of the frame 31 moves downward it first strikes the projecting end of the switch arm 62, thereby moving a slidable contact 65, which normally is in open position, such movement thereby closing the circuit through a lead 65a. On continued movement, the lower end of the mentioned member of the frame 31 engages and depresses a projecting end of the switch arm 63, thereby withdrawing a contact 66 on its opposite end from circuit closing engagement with a lead 66a. Thus, downward movement of the frame 31 first causes the switch arm 62 to actuate the contact 65, which will sometimes be referred to herein as a switch 65, to complete a circuit, and then actuate the switch arm 63 to move the contact 66, which will sometimes be referred to herein as a switch 66, to break a circuit.

When the operator receives the crate C or other package from the feed conveyor 12a and determines the respective car 15 into which it is to be loaded, he presses the respective push button 27 as he transfers the crate to the conveyor 18. Actuation of the push button 27 in turn causes actuation of a relay 68 for the respective button (Fig. 11), a setting solenoid 69 for the respective circuit (Figs. 3 and 11) being thereby energized and causing movement of a respective contactor bar 70 (Fig. 11). The bar 70 serves to close a circuit leading by way of a contact 70a through the normally closed circuit-breaking switch 66. The bar 70 also serves to close a contact 70b in a circuit to a respective solenoid 72 (Figs. 8 and 11) for the respective selector-wheel 25 which has a circular series of actuating pins 74. The solenoid circuit is subsequently completed upon closing of the switch 65 by a downward excursion of the frame 31, thereby energizing the solenoid. Such energization of the respective solenoid 72 causes an adjacent actuating pin 74 in the respective selector-wheel 25, which pin 74 in the construction shown is at the top of the selector-wheel, to be projected as indicated in Fig. 8, so that it will actuate the respective adjustable switch 29 previously mentioned, such actuation of the switch 29 subsequently occurring when the respective selector-wheel 25 is advanced step by step to the position of such adjustable switch 29. When such pin 74, thus set by being projected so that its path of travel will bring it into position to actuate the switch 29, eventually moves the respective switch 29, a circuit is thereby closed which energizes a respective solenoid 75 (Figs. 9 and 11) which in turn actuates a respective air valve 76 to supply actuating pressure to the respective crate ejector 20.

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The setting and actuating mechanisms just described function in the following manner. Each solenoid 72 has a core 80 attached to a pin setting arm 82 (Fig. 8) which is pivoted at 83 upon a bracket 84 carried by the housing of the solenoid 72. The solenoids 72 are mounted upon the forward face of the same panel 24 which carries the selector-wheels 25, the wheels 25 being journaled upon axles 85 in bosses 86 or other suitable mountings which are rigidly secured to the panel 24. Each selector-wheel is provided with a hub 88 working against a friction brake 89 on its boss 86, and through which hub the axle 85 extends, the hub 88 being engaged and retained by a head 90 adjustably fixed upon the outer end of the axle 85 in any appropriate manner, such as by means of an overhanging annulus 91 bound against the corresponding shoulder on the end of the axle 85, an appropriate nut 92 being employed as means to retain the head 90 in its bound position. Such head 90 carries one of the previously mentioned adjustable switches 29 adapted to be actuated by the pins 74 which are projected into position to trip the switch 29. To effect tripping, such switch 29 has a plunger 94 carried in the housing of the switch 29 and projecting therefrom under the influence of springs (not shown) or other means which will yield as a respective pin 74 comes into engagement with a roller 95 carried on the outer end of the plunger 94 and serving as a contacting means.

As illustrated, a multiplicity of the pins 74 are disposed about each of the selector-wheels 25, and wall portions of these pins are frictionally engaged as by an endless coil spring 96 seated in a groove produced by an annular flange 98 lying at the corresponding peripheral portions of such selector-wheel 25. Thus, the friction producing spring 96 holds the pins 74 in either their retracted or extended positions.

The spacing between the pins 74 about each selector-wheel 25 corresponds to any desired given unit of distance, for example ten feet, and each switch 29, with its mounting head 90, is set for multiples of such unit of distance (as calculated from the top position where the pins 74 are set by the respective solenoid 72), so as to correspond with the position of the respective car 15 into which crates or other packages are to be loaded. Thus, a crate or other package having moved five units of distance when it is controlled by the selector-wheel 25 and the switch 29 shown at the right of Fig. 3, will be caused to be ejected through the controlling action of the corresponding set pin 74. If several such crates or packages are to be successively loaded into the same car, several pins 74 successively arranged on the respective selector-wheel 25 will have been set. Similarly, when other crates or other packages controlled by the selector-wheel 25 and the switch 29 shown at the left of Fig. 3 have moved through ten units of space from the starting point, they will be unloaded into a second car 15. Should a large number of successive crates be destined for a given car, the respective button 27 may be locked in depressed position by a corresponding swinging latch 99 carried on the switch box 28 (Fig. 10). As best seen in Figs. 3 and 8 each selector-wheel 25 is provided with a peripheral series of ratchet teeth 100 lying beyond the locus of the pins 74, and these teeth 100 provide means for advancing each selector-wheel 25 step by step with the rotation of the cam 26 which is driven by the shaft 39. Such

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step by step rotation of the selector-wheels 25 is effected by means of dogs 101 pivotally mounted on pivots 102 at the sides of a pull rod 104 slidable in appropriate guides 105 and periodically advanced by the cam 26 through the means of a rocker arm 103 pivoted at 107 on the panel 24, the lower end of the arm 103 carrying a bearing roller 108 adapted to be engaged by the cam 26 and attached at its upper end through a pivot 110 to the forward end of the pull rod 104. In this manner, each rotation of the cam 26 actuates the rock arm 103 to pull forward the pull rod 104 and cause the dogs 101 to advance the respective selector-wheels 25 one step. Each step is represented by the length of a tooth 100 and by the spacing between centers of the pins 74. In this manner a pin 74 which has been previously set by its respective setting solenoid 72 is advanced step by step in synchronism with movement of the conveyor chains 32 until it actuates the respective switch 29 so that the respective crate C or other package is ejected and loaded into the selected railroad car 15. After the cam 26 has disengaged the roller 108, a spring 112 working against a stop 113 on the pull rod 104 and against one of the guides 105 serves to return the pull rod and its dogs 101 to the initial position shown in Fig. 3.

In order that the pins 74, after they have functioned to operate their respective switches 29, may be returned to initial position preparatory for a subsequent setting by the respective setting solenoids 72, return arms 115 are provided, the upper end of each arm 115 being secured to an appropriate adjacent portion of the framework, which may be that to which the guides 105 are attached. The lower portion of each arm 115 has a cam section 115a which projects into the path of the revolving pins 74 and forces them back from their set operative positions to their initial inoperative positions.

With respect to the ejector mechanisms 28, when a switch 29 on a respective selector-wheel 25 has been actuated by a corresponding set pin 74, and the respective ejector solenoid 75 thereby energized through the closing of the switch 29, the air valve 76 (Fig. 9) is actuated by means of a lever arm 120 appropriately pivoted at 121 on any adjacent portion of framework 122, the lever arm 120 being in turn actuated by a solenoid core 124 of the respective solenoid 75. Under such operation, the swinging end of the lever arm 120 moves a valve plunger 125 projecting into the air valve 76. Air feed lines 126, which extend from the air valve 76 to corresponding ends of a cylinder 127, are thus selectively supplied with air under pressure to move a piston (not shown) which controls movement of a piston rod 128 connected with an ejector bar 130 carrying at its upper end an ejector head 132 and having its lower end mounted upon an adjacent standard 19 of the framework through the medium of appropriate pivot means 133. The connection of the piston rod 128 with the ejector bar 130 is preferably a pivotal connection 134, and the opposite end of the cylinder 127 is similarly mounted by a pivotal connection 135 upon an adjacent standard 19 of the framework.

By the above means, as a valve 76 is actuated by the respective solenoid 75 air is correspondingly introduced into the respective cylinder 127 and the ejector bar 130 and its head 132 moved from the full line position of Fig. 9 to the broken line position to eject a crate C so that it is re-

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ceived by the respective roller conveyor 21 for discharge into the selected freight car 15. The ejector head 132 is then automatically returned by the piston rod 128 to the full line position to clear the way for passage of a succeeding crate C, as by having the valve 76 working automatically at the end of its forward stroke to reverse the rod 128 and its piston. As indicated, each ejector bar 130 is provided with a suitable bend 130a which provides for proper overhang of the ejector head 132 as the bar 130 approaches the corresponding conveyor guide 33.

Operation

Assuming the conveyor chains 32 to be in operation, whereby the sprockets 34 and 35 are driven and the gears 37 on the sprockets 35 drive the gears 38 which in turn drive the shaft 39 and the cams 40 to actuate the bell cranks 42, 44 and the frame members 45, the shaft 39 also driving the cam 26 to operate the rocker arm 103 of the pull rod 104 for step by step advancement of the selector-wheels 25 through the dogs 101 working on the teeth 100, when the operator receives a crate C from the feed conveyor 18a and makes his car selection, he then pushes the respective push button 27 and places the crate on the conveyor chains 32. The respective push button 27 sets in operation controls for various electrically operated parts above described, the operation of the system being accomplished as indicated in the wiring diagram shown in Fig. 11. Fig. 11 indicates four units respectively controlled by four push buttons 27 governing mechanisms for unloading selected crates into four freight cars 15 selectively. The following description will refer to a single unit only and the various devices of which it is composed.

The selected push button 27 having been depressed, the switch in the switch box 28 is closed which completes the circuit from a main electric feed line 150 through a line 151 leading to the solenoid 69 and thence to a return line 152 connected with a main return line 153 which may be housed in the cable along with the main line 150. When the solenoid 69 is energized, its core 69a is actuated to move its contactor bar 73 to close the switch indicated at 70a for completing a circuit through a line 154 that leads to the normally closed circuit-breaking switch 66, which, as above described, is adapted to be opened by the downward excursion of the vertical transverse frame 31 when properly positioned by a crate C, as indicated in Fig. 5. During its normally closed position the switch 66 serves to connect its line 66a (see also Fig. 6) with a branch 150a of the main feed line 150. Thus, with the switch 70a closed by reason of actuation of the contact bar 73, the circuit through the solenoid 69 is maintained after the push button 27 is released. Thus, the solenoid 69 remains energized until something else happens to break the circuit subsequently. When the contactor bar 73 is moved by the solenoid core 69a to close the switch 70a, it also closes the switch 70b at its opposite end, this switch 70b connecting the contactor bar by a line 155 leading to the pin setting solenoid 72. However, the solenoid 72 is in a circuit through a line 156 with the normally open circuit-making switch 65 which also is under the control of the crate-actuated vertically moving frame 31. The switch 65, through its line 65a, also is adapted to make a circuit, when closed, through the line 156 to the branch line 150a of the main feed

line 150. Such completion of the circuit through the switch 65 to energize the solenoid 72 is effected by the action of the crate C under influence of the moving chain of the conveyor 32 to force the upper end of the vertical frame 31 to the left, that is toward the rear, as illustrated in Fig. 5. This brings the notches 55 in the upper end of the arms of the frame 31 into engagement with the fingers 56 on the upper ends of the side members 45, so that, on the next excursion of the members 45 under influence of the cam 40, the bell cranks 42, 44, and the return springs 46, the lower end of one of the arms of the frame 31 will engage the projecting end of the switch arm 62 and close the switch 65. This closing of the switch 65 completes the circuit through the solenoid 72 which is thereby energized and causes its arm 82 to project the uppermost pin 74 in the selector-wheel 25 into the projected or set position shown at the top of Fig. 8. At the end of its stroke, the lower end of the mentioned member of the frame 31 strikes the projecting end of the switch arm 63 which actuates the circuit-breaking switch 66, thereby breaking the circuit through the line 154 and hence to the solenoid 69. Thereupon the solenoid core 69a and the contactor bar 70 are returned to inoperative positions so as to break their switches 70a and 70b. This completely de-energizes the electrical system until such time as any push button 27 is actuated, or until a set pin 74 in the selector-wheel 25 reaches and engages its ejector switch 29.

When a pin 74, which has previously been set in projected position on its selector-wheel 25, engages the roller 95 on the plunger 94 of its ejector controlling switch 29, the plunger 94 is depressed into the switch, thereby closing a line 160 which completes a circuit through the branch line 150a to the ejector controlling solenoid 75 which is connected to the main return line 153 through a branch line 161. The solenoid 75 then causes actuation of the air valve 76 to control the passage of air under pressure to the cylinder 127 which actuates the ejector head 132 to eject the crate C from the conveyor chains 32, and deposit it on the unloading conveyor 21, as hereinbefore indicated. When the respective pin 74 has passed beyond the roller 95 on the plunger 94 of the respective ejector controlling switch 29, the plunger 94 returns to break the circuit to the solenoid 75 so that air controlling means in the air valve 76 is returned (by suitable spring means or the like not shown) and the ejector bar 130 and its ejector head 132 are returned to the starting position shown in full lines in Fig. 9.

As previously described, the rotation of the shaft 39 by the sprockets 35 and the gears 37 and 38 drives the cam 26 as well as the cams 40, so that the rocker arm 106 is caused to actuate the pull rod 104 whereby the dogs 101 engage the selector-wheel teeth 130 and advance all of the selector-wheels 25 step by step. Each time a selector pin 74 which has been set in projected position engages and passes the roller 95 of its ejector control switch 29, the ejector head 132 of the respective ejector mechanism 26 is actuated. As the projected pins 74, which have performed their function, approach the starting point, they are returned to their starting position by the cam-like end 115a of the return arm 115 which is provided for each of the selector-wheels 25.

Where there is no crate C in position upon

the chains 32 and against the upper end of the vertical frame 31, each operation of the cam 40 for movement of the bell cranks 42, 44 merely causes an excursion of the side members 45 in a vertical path without other effect, and the selector-wheels 25 are advanced a corresponding notch by the cam 26. The crates already upon the conveyor chains 32 will continue to move along the conveyor structure 13 toward their points of discharge.

Should a crate C have been placed upon the conveyor and have actuated the upper end of the frame 31 to cause it to be drawn downward out of the path of the crate by the next excursion of the side members 45, without the operator's having pressed any one of the push buttons 27, such crate will pass to the far end of the conveyor 18 beyond the freight cars 15, and be discharged at said far end without having been loaded into any of the cars. In this manner, crates which in the operator's opinion are not acceptable for loading into any car may be discarded. However, if it be desired that every crate is to be unloaded into some car, and it is required to protect against any crate's passing the trip mechanism 30 without a selection having been made by an appropriate button 27, a slight modification may be employed which is illustrated in Fig. 7. This consists in providing a control for the bell crank arm 44 so that it will not be actuated sufficiently to pull down the frame 31 unless a selection has been made through an appropriate push button 27. Here, the forward end of an arm 244, which corresponds generally with the bell crank arm 44 of the other form, extends forward of a pivot 243, by which it is mounted upon the adjacent standard 19, to provide a portion 244a which cooperates with a forwardly extending portion 242a of an arm 242 which corresponds with the bell crank arm 42 of the other form. Between the ends of these arms there is secured a solenoid 245 which is cut into the circuit of each push button 27 so that, if a push button 27 is not pressed, the solenoid 245 is not energized. On the other hand, when a push button 27 is depressed, the solenoid 245 is energized to draw the two arm portions 242a and 244a together, so that when the cam 40 lifts the rearward end of the arm 242 it causes the rearward end of the arm 244 to be lifted high enough to elevate the side members 45 high enough for the fingers 56 at the upper ends thereof to be received in the notches 55. On the other hand, if the solenoid 245 is not energized, the rearward end of the arm 242 normally is held at such a high position that its elevation by the cam 40 does not elevate the rearward end of the arm 244 sufficiently high for the fingers 56 to be received in the notches. Under such circumstances the frame 31 will not be drawn downward when the side members 45 are drawn downward by the springs 46, and the chains 32 slide under the crate, as they do in every case before the frame 31 is actuated to release the crate. Any appropriate relay arrangement may be employed in conjunction with the solenoid 245 to maintain its energized condition for a sufficient time to permit actuation by the cam 40, any corresponding circuit being broken at the end of the cycle, as when the switch 65 acts to break its respective circuit. Such a relation is indicated in Fig. 11 where the solenoid 245 is connected into the line 66a. Thus, until a button 27 is pressed to actuate the contact bar 70 and energize the circuit to the solenoid 72, the solenoid 245 re-

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mains inactive so that the fingers 56 cannot reach the notches 55 to draw down the frame 31, the springs 61 serving to retain the frame 31 elevated even though pressed by a crate on the conveyor.

Since other variations of the generic invention herein disclosed will become apparent to those skilled in this art, it is intended to cover all such modifications as fall within the scope of the claims.

I claim as my invention:

1. A conveyor system including in combination: conveyor means for advancing articles to be selectively discharged therefrom at a plurality of predetermined stations therealong; selector devices respectively having control means for determining at which station discharge will occur; setting means for each of said selector devices; plural parts on each of said selector devices and individually settable by the respective setting means; an electric switch controller for each selector device and disposed in the path of and actuable by a set movable part; means adjacent said conveyor means and actuable by an article on said conveyor means for controlling actuation of said setting means; and a plurality of electrically controlled discharge means along said conveyor means at said stations to engage and eject articles from said conveyor means, the respective discharge means being connected with and under the control of the respective electric switch controllers.

2. In a conveyor system adapted for the simultaneous transport and the selective distribution of articles, the combination of: a conveyor for advancing articles to be distributed; means to operate said conveyor; a plurality of discharge means respectively disposed at a plurality of discharge stations along said conveyor; a plurality of selector means for causing ejections at the respective stations at which articles on said conveyor are to be discharged therefrom; and means actuable by said selector means for effecting operation of the respective discharge means, each selector means including a wheel rotated at a uniform rate by said conveyor operating means, settable means on said wheel and adapted when set to actuate said means actuable to effect said operation of said respective discharge means, and selectable setting means for selectively setting said settable means, said means actuable by said selector means for effecting operation of the respective discharge means including electric control switch means operable by said settable means when set, and also including lines connecting such electric control switch means with the respective discharge means, said selector means and said means actuable by said selector means and said electric control switch means being arranged in a group remote from said discharge means, said electric control switch means being disposed in the path of said settable means when set whereby to close a respective circuit upon contact with such a set means, each electric control switch means being adjustable with respect to its wheel in accordance with distances to be travelled by respective articles to be ejected.

3. A selective distribution apparatus including in combination: an elongated conveyor for advancing articles to be distributed; a plurality of ejectors arranged at a plurality of spaced stations along said conveyor; a plurality of circuits controlling the respective ejectors; plural switch means respectively controlling said ejector circuits; selectively operable switch means operable by an operator for selecting circuits; movable

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means disposed adjacent said conveyor and in the path of articles on said conveyor and successively operable by articles being advanced on said conveyor; means for intermittently withdrawing said movable means from said path; switch means actuable by said movable means upon such intermittent withdrawals to control energizing of a selected circuit; a plurality of selector devices respectively connected with and respectively controlling said plural switch means for said ejector circuits; settable devices on each of said selector devices and movable selectively into set positions to actuate the respective switch means for said ejector circuits; setting means for each selector device for setting a settable device, and circuits controlling the respective setting means, said selectively operable switch means being disposed in and respectively controlling the last mentioned circuits.

4. A combination as in claim 3 wherein said selector devices are rotary wheels carrying said settable devices, the combination including means operating said withdrawing means and said rotary wheels in synchronism.

5. In a conveyor system for the selective distribution of articles: an elongated conveyor for simultaneously advancing a plurality of articles to be distributed; means to operate the conveyor; a plurality of discharge means disposed respectively at discharge stations along said conveyor; plural means for selectively energizing respective electric circuits for said discharge means; intermittently operating means working in synchronism with said conveyor moving means; means actuated intermittently by and in synchronism with said intermittently operating means; means movable by each article as such article is moved on the conveyor to a predetermined position, said movable means being brought by such moving article into position to be moved by said intermittently actuated means; normally open switch means adapted to be closed by said movable means when so moved, whereby to energize the selected circuit; a plurality of relatively movable selector devices for respectively controlling said discharge means, and movable by said intermittently operating means, each selector device having a series of selectively positionable means; a plurality of setting means respectively located to actuate selectively the respective positionable means, the respective setting means being actuated when a selected circuit is energized and thereby setting a corresponding positionable means; and control means for each selector device and actuable by a set positionable means on such selector device for effecting operation of the respective discharge means.

6. A system as in claim 5 wherein each control means for the respective selector device is an electric switch whose position is adjustable with respect to said setting means for the respective selector and is disposed in the path of said positionable means when set by said setting means for causing ejection of an article at a predetermined station by the respective discharge means.

7. A system as in claim 6 wherein said selector devices are rotary and said electric switch control means are rotatively adjustable.

8. In a conveyor system for the selected distribution of articles: an elongated conveyor for simultaneously advancing a plurality of articles to be discharged; a plurality of discharge devices respectively disposed along said conveyor at discharge stations; a plurality of selector wheels respectively provided for said discharge devices;

means for rotating said wheels and operating said conveyor in synchronism; a plurality of settable means on each of said selector wheels adapted to be selectively set in operative position; a plurality of setting devices respectively provided for said selector wheels in relationship to set said means to be set on said selector wheels; means for selectively actuating said setting devices; electric switch means adjustably mounted at the axis of each selector wheel and adjustable in an arc about said axis, each electric switch means having an actuable member disposed in the path of set means on the respective selector wheel, whereby such set means causes actuation of the respective switch means upon sufficient rotation of its selector wheel; and means operatively connected with each switch means for effecting actuation of the respective discharge devices.

9. A conveyor system including in combination: conveyor means for advancing articles to be selectively discharged therefrom at a plurality of predetermined stations therealong; selector devices for respectively determining at which station discharge of articles will occur; plural settable means on each selector device; setting means for each selector device to set respective settable means selectively; a plurality of discharge means along said conveyor means at the

respective stations; means adjacent said conveyor means in the path of an article on said conveyor and actuable by such article; and means connecting said article actuable means with said setting means for controlling actuation of said setting means, each selector device including a wheel carrying its settable means adjacent its periphery, a shaft upon which said wheel is rotatably mounted, switch means held in relatively fixed position on the respective shaft to engage with respective settable means when set for actuation of said switch means by such set means, and means connecting the respective switch means with the respective discharge means to operate the latter upon actuation of such switch means.

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