June 20, 1933. A. N. KLYVER 1,914,778

CONVEYER SYSTEM

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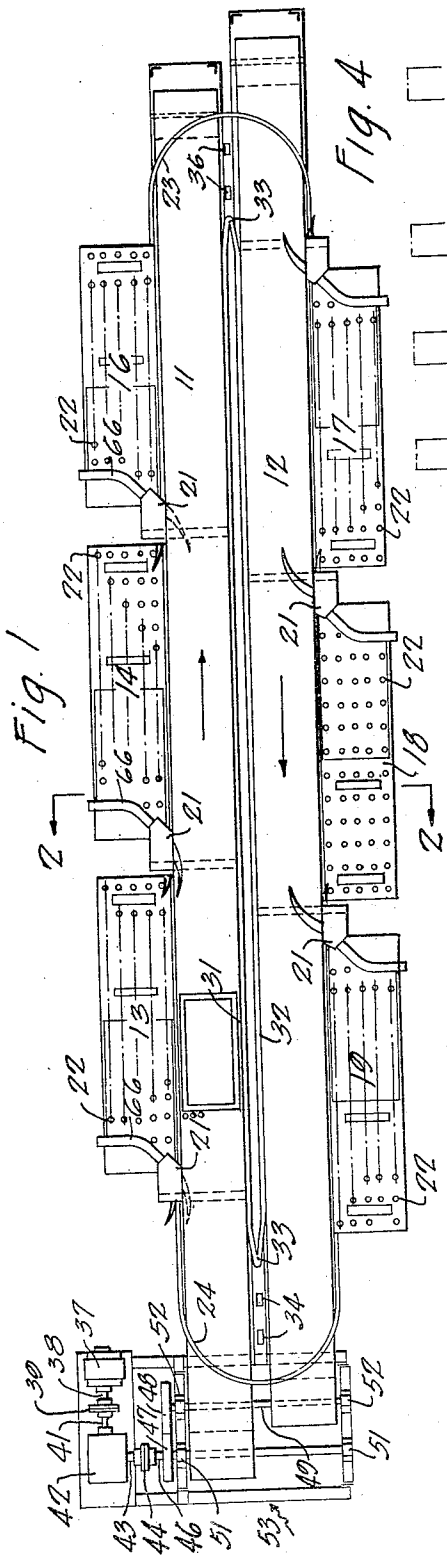


Fig. 1

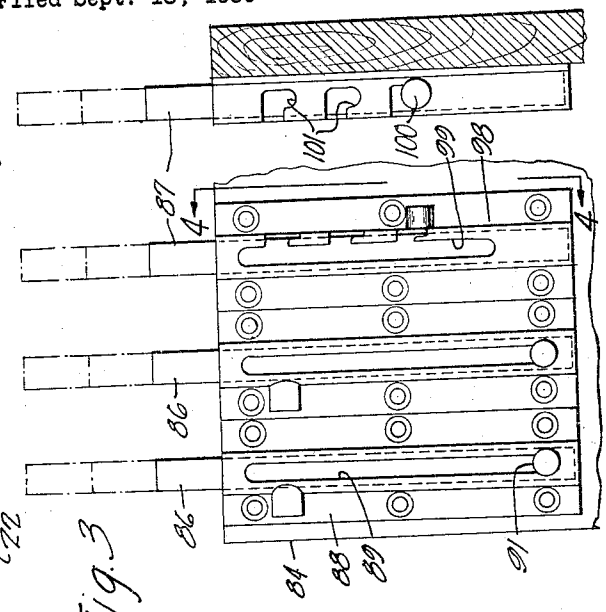


Fig. 3

Fig. 4

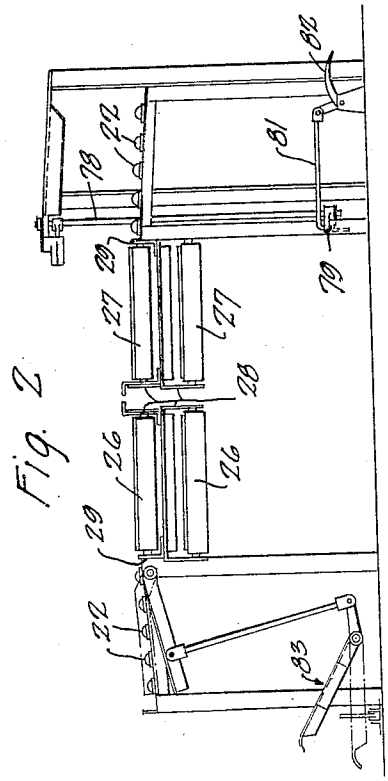


Fig. 2

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Fig. 5

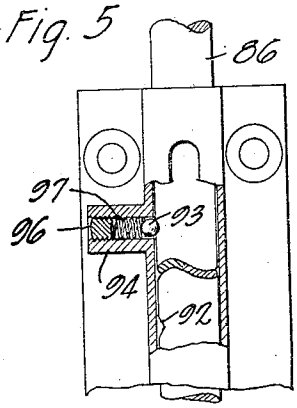


Fig. 6

Fig. 7

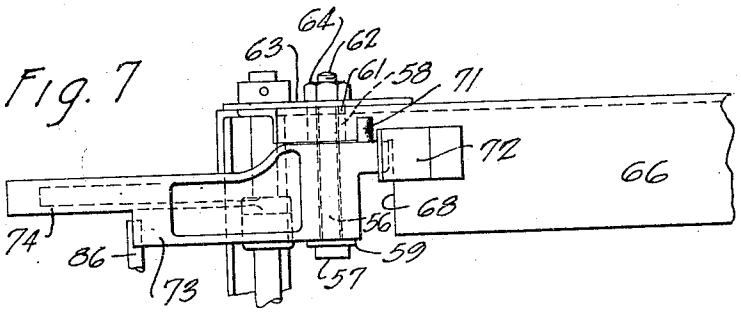
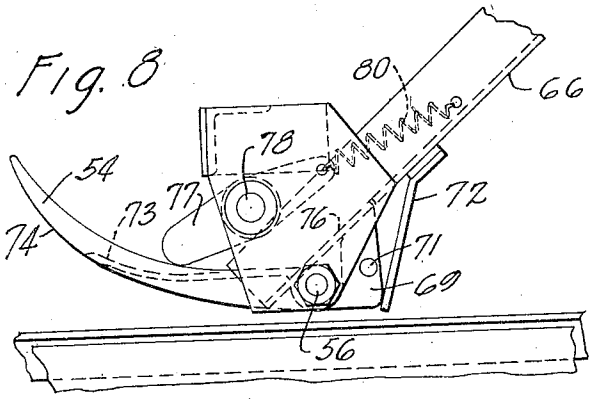


Fig. 8



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UNITED STATES PATENT OFFICE

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CONVEYER SYSTEM

Application filed September 18, 1930. Serial No. 482,811.

This invention relates to conveyer systems of the type comprising conveying means and a plurality of stations or transfer points to which objects such as carriers for example may be dispatched.

It is customary to equip either or both of the receiving stations, and the transfer stations of systems of this kind with deflector apparatus for causing carriers to be removed from the delivering conveyer as such carriers arrive at their respective destinations or rerouting points. It is very desirable that the various stations be equipped with inexpensive as well as thoroughly dependable and efficient transfer or deflector mechanisms for cooperating preferably selectively with the carriers. Moreover it is also advantageous to have deflector mechanisms which is controllable at the will of an operator so that carriers destined for a particular station may be caused to pass by such station and to recirculate in the system until the operator is ready to receive them. Furthermore as these systems may require a relatively large number of carriers which, when subjected only to ordinary operating conditions, will need repairs from time to time it is likewise highly desirable that the individual carriers be of simple and yet rugged and durable construction preferably consisting of relatively few parts which are inexpensive to manufacture or to replace.

Objects of the present invention are to provide improved apparatus of this general character embodying the aforementioned desirable features; to provide improved deflector mechanism of relatively simple and yet efficient construction which preferably may be rendered ineffective or selectively effective at the will of an operator; to provide a carrier having improved means of greatly simplified construction for cooperating with deflector mechanism; and also to provide apparatus of the class described having an improved construction and arrangement of parts.

In the drawings:

Fig. 1 is a top plan view of a conveyer system;

Fig. 2 is a section taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is an elevation of a portion of the rear end of a carrier for use in the system shown in Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a detailed view with parts broken away showing the construction of the elements shown in Fig. 3;

Fig. 6 is a top plan view showing to an enlarged scale the deflector mechanism shown in Fig. 1;

Fig. 7 is a front elevation of the mechanism shown in Fig. 6; and

Fig. 8 is a view similar to Fig. 6 but showing the parts in different relative positions.

The preferred embodiment of the invention as shown in the drawings and particularly in Figs. 1 and 2 thereof comprises belt conveyers 11 and 12 arranged to operate over substantially parallel courses and in opposite directions. The conveyer 11 is adapted to carry objects such as carriers to receiving stations 13, 14 and 16, while the conveyer 12 is likewise adapted to convey carriers to the stations 17, 18 and 19. Each of these stations is preferably provided with deflector mechanism indicated generally at 21. The platform of each station may also be equipped with inverted semi-spherical cups 22 which may also be rotatably mounted to reduce the sliding friction of carriers or other objects passing over the platform. These inverted cups are preferably arranged in longitudinal and transverse rows as indicated in Fig. 1. At the ends of the conveyers at points beyond the end stations guide rails 23 and 24 are arranged to follow semi-circular courses for guiding carriers from one conveyer to the other so that carriers which are not received at stations along one conveyer may continue to circulate in the system until they are received. The belts 11 and 12 of the conveyers may be supported by rollers 26 and 27 suitably spaced longitudinally of the belts below the respective upper and lower runs thereof as shown more clearly in Fig. 2. These rollers may also be mounted in any

suitable affixed supports preferably in the side frames 28 and 29. Central guide rails 31 and 32 extend longitudinally along the inner or adjacent edges of the conveyer belts for guiding material thereon. Preferably these guide rails are joined together at a point 33 spaced sufficiently from the semi-circular guides 23 and 24 to permit transfer of material from one conveyer to the other. Longitudinally disposed anti-friction rollers 34 and 36 may also be arranged between the point 33 and the respective guide rolls 23 and 24 for facilitating the transfer of articles and supporting the articles during that movement.

Power for operating the conveyer system may be supplied by a suitable prime mover as the electric motor 37 which has its armature shaft 38 connected by a coupling 39 to shaft 41 of a speed change unit 42. Power is transmitted from the speed change unit 42 through a shaft 43 and a coupling 44 to the shaft 46 which operates the belt 11 as will be understood. Power is delivered from the shaft 46 through the spur gears 47 and 48 to the shaft 49 which operates the belt 12 in the reverse direction. The shafts 46 and 49 are rotatably supported in bearings 51 and 52 carried by any fixed portion of the apparatus as on the supporting frame work indicated generally at 53.

The deflector mechanism is shown more clearly in Figs. 6, 7 and 8 and comprises a deflector 54 which is in the form of a tongue mounted upon a substantially vertical shaft 56 to swing or pivot transversely of the conveyer between the collars 57 and 58 which are affixed on this shaft. A washer 59 is interposed between the collar 57 and the deflector while a similar washer 61 is disposed on the shaft adjacent the collar 58. Preferably the upper end of this shaft is threaded as indicated at 62 and extends through and is fixedly attached to a supporting plate 63 by means of a nut 64 engaging the threaded portion of the shaft. The supporting plate 63 is fixedly attached to the upper surface of a deflecting guide rail 66 which is in the form of an angle having one leg disposed substantially horizontal and the other leg depending substantially vertical therefrom. The latter leg thus provides an upright wall, the inner surface 67 of which is useful for guiding abutments as will be more fully pointed out hereinafter. This upright wall has an opening or cutaway portion 68 (Fig. 7) through which the deflecting tongue 54 may swing. This tongue is provided with a rearward extension 69 on which is disposed a suitable abutment such as a pin 71. This pin is positioned to engage the angle 66 as shown in Fig. 6 to limit outward or counter-clockwise movement of the deflecting tongue 54. A flat spring 72 is mounted upon the angle 66 and arranged to engage the rearward extension 69 of the deflecting tongue 64. This spring is preferably so mounted with respect to the pivotal support for the deflecting tongue 54 that when the parts are in the position shown in Fig. 6 the spring 72 tends to hold the pin 71 against the angle 66 and thus to maintain the parts in this position, while when the deflecting tongue is moved to the position shown in Fig. 8 the spring 72 bears on the rearward extension 69 at a point substantially in line with the pivotal axis of the tongue 54 and therefore tends to maintain the tongue in the position shown in this figure. It will also be seen that this arrangement tends to give a snap movement to the tongue 54.

In order that this deflector may be selective the tongue 54 is provided with similarly curved inner and outer guiding surfaces 73 and 74 respectively. As here shown both of these guiding surfaces are substantially vertical and extend horizontally for guiding abutments by causing the latter to slide therealong. The outer guiding surface 74 is disposed above the inner guiding surface 73 as will be apparent from Fig. 7. Also the inner guiding surface terminates at a point within and approximately tangent to a plane including an intermediate portion of the outer surface. In this way the surface 74 is made to extend beyond the inner surface and across the path of approach of articles to the latter for intercepting abutments disposed at higher levels. The inner guiding surface also merges into an obliquely disposed guiding surface 76 formed on the rearward extension 69. This rearward extension is so proportioned that when the parts are in the position shown in Fig. 8 the obliquely disposed guiding surface 76 will span the opening 68 in the angle 66 to provide a substantially continuous wall for guiding abutments to the inner wall 67 of the angle.

In order that this deflector mechanism may be controllable by an operator a rocker 77 is fixedly mounted on a vertically disposed rotary shaft 78. The forward arm of this rocker is arranged to be engageable with the inner guiding surface 73 of the deflector 54. A coil spring 80 is attached to a fixed support such as the angle 66 and also to the rearwardly extending arm of the rocker 77 so as normally to urge this arm to the position shown in Fig. 8. Referring to Fig. 2 it will be seen that the vertical shaft 78 carries on its lower end a crank arm 79 which is connected through a link 81 to a treadle mechanism 82. As further shown in this figure the platforms of the receiving stations may also have associated therewith another treadle mechanism indicated generally at 83 for manipulating these platforms in a manner well understood in this art and therefore not set forth specifically here.

This system is also preferably furnished

with improved carriers which as shown in Figs. 3 and 4 comprise a body 84 having a series of adjustable abutments mounted across the rear end thereof. Specifically these abutments are in the form of bolts 86 and 87. The bolts 86 are supported for substantially vertical movement in housings 88. Each of these housings is provided with a vertical slot 89 which receives the handle 91 of the bolt. As shown more clearly in Fig. 5 each bolt 86 is provided with a number of longitudinally spaced recesses 92 in which a spherical member 93 is receivable. The housing is provided with a cored boss 94 having the outer end thereof closed by a plug 96. A spring 97 seats against the plug 96 and against the ball or spherical member 93 yieldably to press the latter against the body of the bolt. The handle slot 89 serves as a guide for the handle to assure that the recesses 92 will be brought into position to receive the ball 93 as the bolt is moved longitudinally through the housing.

The bolt 87 as shown in Figs. 3 and 4 is mounted in a housing 98 which is provided with a handle slot 99 and a series of vertically spaced bayonet slots 101 each of which communicates with the handle slot 99 and serves therefore to retain the handle 100 and thus to hold the bolt 87 in various positions of vertical adjustment.

In the operation of the apparatus a carrier destined for a particular station has an abutment such as one of the bolts 86 or 87 adjusted to project above the body of the carrier a distance sufficient only to engage the inner guiding surface 73 of the deflector tongue 54 of the selected stations. When the operator at the station shown in Figs. 6, 7 and 8 is ready to receive another carrier he may operate the treadle 82 and cause the rocker 77 to move against the tension of spring 78 and due to its engagement with the inner surface 73 to move the deflector 54 into the position shown in Fig. 6 in which this deflector is in the path of the abutment 86 at the left in Fig. 3. When a carrier having its abutment 86 adjusted to the proper level approaches this station the abutment will pass under the higher guiding surface 74 as indicated in Fig. 7 and further movement of the conveyer will bring this abutment into sliding engagement with the inner guiding surface 73. As the abutment moves along this wall it is gradually moved transversely of the conveyer and eventually engages the obliquely disposed surface 76. Upon engagement with the latter surface the deflector tongue is snapped over from the position shown in Fig. 6 to the position shown in Fig. 7 in which latter position the surface 76 guides the abutment on to the inner surface 67 of the angle 66. This angle may have any desired configuration but preferably is bent as indicated in Fig. 1, to position the carrier properly upon the receiving station.

In the event that an operator is not ready to receive a carrier he may leave the apparatus in the condition shown in Fig. 8 and thereby cause the carrier destined for his station to recirculate in the system until such time as he is ready to receive it. This recirculation is facilitated by the arrangement of the semi-circular guides 23 and 24 and the transverse rollers 34 and 36 shown in Fig. 1. When the operator is ready to receive another carrier he may press down on the treadle 82 and thereby rotate the shaft 78 and cause the rocker 77 to move the deflecting tongue into the position shown in Fig. 6 in which it is yieldably held by a flat spring 72. As soon as pressure is relieved from the treadle mechanism the spring 80 acts to return the rocker 77 to the position shown in Fig. 8 in which condition it does not interfere with movement of the deflector tongue to the position shown in that figure.

After the deflecting tongue has been positioned in this manner, it is possible for a carrier destined for another station to engage this tongue, having its abutment at the left higher or lower than that of carriers destined for this station as above described. Of course if the abutment on the carrier is lower it will readily pass under the tongue 54 while if it is higher it will engage the outer deflecting surface 74 and swing the tongue outwardly against the action of the spring 72 and therefore readily pass by this particular station. In this way it is assured that only carriers having abutments 86 in the left casings adjusted to the proper predetermined level to engage the lower guiding surface 73 will be deflected or received at this station. The abutments at the center or right-hand casing of the carriers obviously do not engage the deflector tongue 54 of the illustrated station. It will be understood however that the deflector tongues of other stations are formed to extend over the conveyer belts to greater distances so that they will coact with these abutments and engage and remove carriers intended therefor.

Another improved feature of the invention resides in the means for positioning the abutments with respect to a carrier. As shown in Figs. 3, 4 and 5, it will be seen that each abutment 86 or 87 is capable individually of adjustment to three different positions. The abutments are furthermore of a simple and inexpensive construction and in case of damage may be replaced from parts commonly carried in stock by local dealers in articles of this type, thus avoiding the delay of sending to the factory for parts. As adjustable bolts of this type are manufactured in considerable quantity they are also relatively inexpensive.

It should be understood that the present disclosure is for the purpose of illustration

only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. The combination with a conveyer of deflector mechanism comprising a member having an upright wall providing a guiding surface for abutments, the upright wall having an opening therein, a deflector, means for supporting the deflector to swing transversely through the opening in the upright wall, the deflector having oppositely disposed guiding surfaces for engagement with abutments to cause the latter to move therealong, one of the guiding surfaces being disposed above and extending beyond the other for intercepting the higher abutments, the deflector having an obliquely disposed guiding surface merging into the other of the first-mentioned guiding surfaces, the deflector being movable on engagement of an abutment with the obliquely disposed surface to cause the latter to span the opening in the upright wall whereby an abutment may be guided by the obliquely disposed surface to the guiding surface provided by the upright wall.

2. The combination with a conveyer, of deflector mechanism comprising a member having an upright wall providing a guiding surface for abutments, the upright wall having an opening therein, a deflector, means for supporting the deflector to swing transversely through the opening in the upright wall, the deflector having oppositely disposed guiding surfaces for engagement with abutments to cause the latter to move therealong, one of the guiding surfaces being disposed above and extending beyond the other for intercepting the higher abutments, the deflector having an obliquely disposed guiding surface merging into the other of the first-mentioned guiding surfaces, the deflector being movable on engagement of an abutment with the obliquely disposed surface to cause the latter to span the opening in the upright wall whereby an abutment may be guided by the obliquely disposed surface to the guiding surface provided by the upright wall, the last-mentioned movement of the deflector also being effective to remove the latter from the path of approach of other abutments.

3. The combination with a conveyer, of deflector mechanism comprising a member having an upright wall providing a guiding surface for abutments, the upright wall having an opening therein, a deflector, means for supporting the deflector to swing transversely through the opening in the upright wall, the deflector having oppositely disposed guiding surfaces for engagement with abutments to cause the latter to move therealong, one of the guiding surfaces being disposed above and extending beyond the other for intercepting the higher abutments, the deflector having an obliquely disposed guiding surface merging into the other of the first-mentioned guiding surfaces, the deflector being movable on engagement of an abutment with the obliquely disposed surface to cause the latter to span the opening in the upright wall whereby an abutment may be guided by the obliquely disposed surface to the guiding surface provided by the upright wall, the last-mentioned movement of the deflector also being effective to remove the latter from the path of approach of other abutments, and means tending to hold the deflector either in the path of approach of abutments or in a position to one side thereof.

4. The combination with a conveyer, of deflector mechanism comprising a member having an upright wall providing a guiding surface for abutments, the upright wall having an opening therein, a deflector, means for supporting the deflector to swing transversely through the opening in the upright wall, the deflector having oppositely disposed guiding surfaces for engagement with abutments to cause the latter to move therealong, one of the guiding surfaces being disposed above and extending beyond the other for intercepting the higher abutments, the deflector having an obliquely disposed guiding surface merging into the other of the first-mentioned guiding surfaces, the deflector being movable on engagement of an abutment with the obliquely disposed surface to cause the latter to span the opening in the upright wall whereby an abutment may be guided by the obliquely disposed surface to the guiding surface provided by the upright wall, the last-mentioned movement of the deflector also being effective to remove the latter from the path of approach of other abutments, means tending to hold the deflector either in the path of approach of abutments or in a position at one side thereof, and normally ineffective means for moving the deflector into said path.

5. In a system comprising a conveyer by which are transported carriers each of which has an abutment thereon, deflector mechanism including a tongue providing a guiding surface adapted to assume an operative position in which it extends over the conveyor or an inoperative position in which it is at the side of the conveyer and which, in the first position, is engaged by an abutment disposed at a predetermined level and moved into the second position, means for yieldably holding the tongue in either of said positions, and operator controlled means for returning the tongue from the second position to the first position.

6. In a system comprising a conveyer by which are transported carriers each of which has an abutment thereon, and a station along

the path of travel of the conveyer, deflector mechanism associated with said station and including a tongue providing a guiding surface which, when extended over the conveyer, engages an abutment disposed at a predetermined level and causes it to slide along said surface so that the carrier, on which said abutment is mounted, will be deflected to the station with which the mechanism is associated, said abutment upon arrival at a certain point on the guiding surface causing the tongue to be moved from the extended position to an inoperative position at the side of the conveyer.

7. In a system comprising a conveyer by which are transported carriers each of which has an abutment thereon, and a station along the path of travel of the conveyer, deflector mechanism associated with said station and including a tongue providing a guiding surface which, when extended over the conveyer, engages an abutment disposed at a predetermined level and causes it to slide along said surface so that the carrier, on which said abutment is mounted, will be deflected to the station with which the mechanism is associated, said abutment upon arrival at a certain point on the guiding surface causing the tongue to be moved from the extended position to an inoperative position at the side of the conveyer, and operator controlled means for restoring the tongue to the extended position.

8. In a system comprising a conveyer by which are transported carriers having an abutment, movably mounted deflector mechanism consisting of means providing a substantially smooth guiding surface for slidably engaging abutments disposed at a predetermined level to guide carriers having such abutments to a station at one side of the conveyer, other means for engaging carrier abutments disposed above the predetermined level to prevent their engagement by the first named means and the guiding of carriers having such abutments to the station, and means for moving the deflector mechanism between an operative position above the conveyer and an inoperative position at one side of the conveyer.

9. In a system comprising a conveyer by which are transported carriers having an abutment thereon, deflector means movable into and out of the path of travel of the carriers and providing a substantially smooth guiding surface which when moved into the path slidably engages abutments disposed at a predetermined level to guide the carriers having such abutments to a station at one side of the conveyer, and means extending beyond the guiding surface of the first named means to engage abutments disposed above the predetermined level, said first named means being moved out of the path of travel of the carriers by the second named means upon the engagement of abutments therewith.

10. Mechanism for selectively deflecting carriers by engagement with abutments thereon comprising means provided with upper and lower surfaces, such surfaces being similarly curved and the upper surface extending beyond the lower, the end portion of the lower surface being approximately tangent to a plane including an intermediate portion of the upper surface, said lower surface acting, when engaged by carrier abutments to deflect the carriers having such abutments and said upper surface acting when engaged by carrier abutments to move said lower surface out of the path of travel of the carriers.

11. Mechanism for selectively deflecting carriers by engagement with abutments thereon comprising integral means providing upper and lower surfaces for engagement with the carrier abutments when said means are in the path of travel of the articles the surfaces being similarly curved and the upper surface extending beyond the lower surface, the end portion of the lower surface being approximately tangent to a plane including an intermediate portion of the upper surface, said lower surface acting when engaged by abutments disposed at a predetermined level to deflect the carriers having such abutments and said upper surface acting when engaged by abutments disposed at a higher level to move said means out of the path of travel of the carriers.

12. Deflector mechanism for engagement with abutments on carriers of a conveyer system, said mechanism comprising a unitary member having inner and outer similarly curved substantially vertical surfaces at different levels for engagement with abutments on the carriers, the lower surface acting to deflect carriers having abutments disposed at a predetermined level, and the upper surface acting when engaged by abutments disposed at a higher level to move said member out of the path of travel of the carriers.

13. Deflector mechanism for engagement with abutments on carriers of a conveyer system, said mechanism comprising a unitary member having inner and outer similarly curved substantially vertical surfaces at different levels for engagement with abutments on the carriers, the lower surface acting to deflect carriers having abutments disposed at a predetermined level, and the upper surface acting when engaged by abutments disposed at a higher level to move said member out of the path of travel of the carriers and independent means for moving said member into and out of such path.

Signed by me at Syracuse, New York this 12th day of September 1930.

ALBERT N. KLYVER.