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SWITCHING MEANS FOR CONVEYERS

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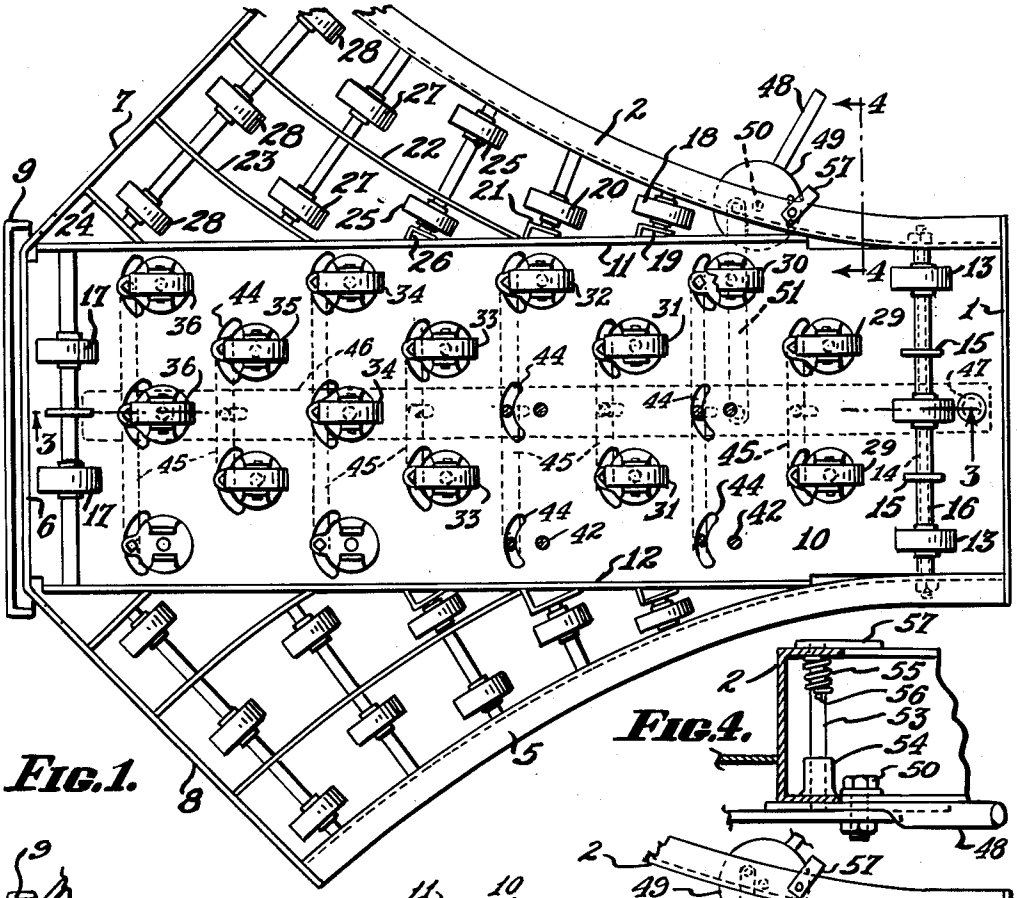


FIG. 1.

FIG. 4.

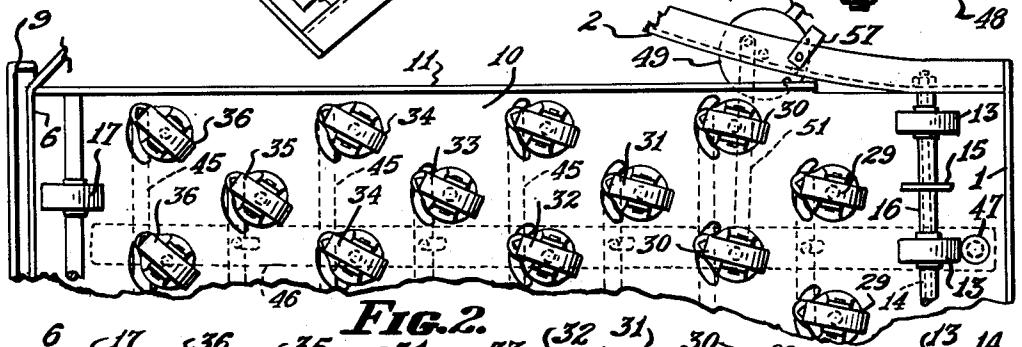


FIG. 2.

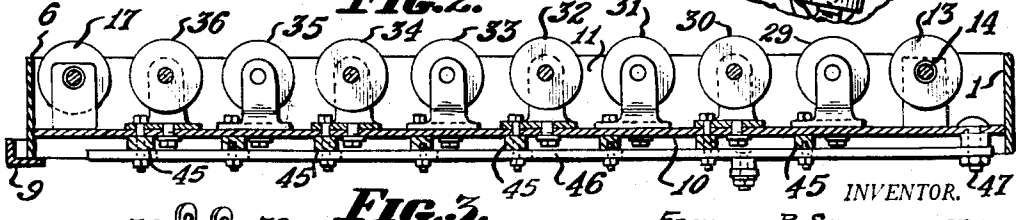


FIG. 3.

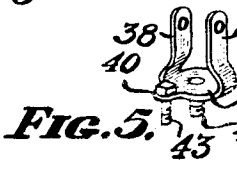


FIG. 5.

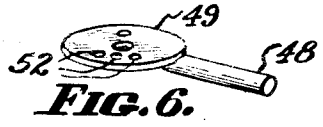


FIG. 6.

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SWITCHING MEANS FOR CONVEYERS

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7 Claims. (Cl. 193—36)

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My invention relates to means for determining the course of articles traveling on a conveyor at a point where the conveyor branches. It is an object of the invention to provide a simple and inexpensive switching means.

It is my object to provide a switch which may be thrown selectively to permit travel of the articles from a first conveyor section to a second which is a rectilinear prolongation of the first, or to third or fourth conveyor sections which branch respectively to the right and left.

It is my object to provide a switch which may be thrown by a simple operation such as the movement of a lever, and in this connection I avoid the use of conveyor sections of pivoted character which must be bodily moved, swung or turned upside-down.

It is my object to provide a construction in which for switching purposes I move only the rolling supports for articles, and these individually at different angular displacements so that a smooth action occurs and little force is required for the switching.

It is an object to provide a switch so easy and rapid in its action that it becomes more than a means for setting the conveyor for the determined travel of a succession of articles, and may be used as means for assorting to different paths of travel individual articles approaching it in reasonably interspaced relationship.

These and other objects of my invention, which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish by that construction and arrangement of parts of which I shall now describe an exemplary embodiment. Reference is made to the accompanying drawings wherein:

Figure 1 is a plan view of my exemplary construction set for straight-away operation.

Figure 2 is a partial plan view of the device set for diversion of articles to the right.

Figure 3 is a sectional view taken along the line 3—3 of Figure 1.

Figure 4 is a partial sectional view taken along the line 4—4 of Figure 1.

Figure 5 is a perspective view of a clevis member which I use.

Figure 6 is a partial perspective view of an operating lever.

The apparatus herein illustrated and described is used in connection with a conveyor section which delivers articles to it and other conveyor sections which receive the articles and carry them away. These conveyor sections are not illustrated and do not constitute limitations on the invention. They may be visualized, for example, as roller conveyor sections of conventional kind.

My switching device has a front frame member 1, side rail members 2 and 5 of curved formation and channel-shaped cross-section, and a rear frame member having a central section 6 paralleling the member 1 and angularly related sections 7 and 8 extending to meet the ends of the rails 2 and 5. The entering conveyor section (not shown) may be juxtaposed or fastened to the member 1. Similarly, the leaving straight-away conveyor section is juxtaposed or fastened to the member 6, and the leaving right and left branch conveyors respectively to the members 7 and 8. I have shown a socket member 9 fastened to the frame section 6 for receiving the end of a conveyor section.

I provide a plate 10 extending between frame members 1 and 6 to which it is welded or otherwise fastened. The side edges of this plate are turned upwardly to form rails 11 and 12, which are cut away at their ends as shown.

At the entrance end of my device rollers 13 are mounted on a rod or shaft 14 extending between the side rails 2 and 5. Intermediate supports 15 for the shaft may be provided on the plate. It is my practice to employ ball-bearing rollers on the shaft 14, and spacers 16 of tubular character slipped over the shaft. The ends of the shaft may be threaded where they pass through the rails 2 and 5 and provided with nuts. A similar construction may be adopted for all other fixed shafts in the device; but the construction itself is exemplary only. These rollers 13 may be considered as a continuation of the entering conveyor.

At the exit end similar rollers 17, mounted on a rod or shaft extending between the plate rails 11 and 12 may be considered the start of a straight-away exit conveyor.

The rails 2 and 5 have circular curvature, and between them and the plate side rails 11 and 12, I provide a series of rollers on axes extending radially of the rails 2 and 5. Thus, a first roller 18 is mounted on a shaft extending between the rail 2 and an angular bracket 19 welded or otherwise fastened to the plate rail 11. A second roller 20 is mounted on a shaft extending between the rail 2 and an angular bracket 21 on the plate rail 11.

Supplementary rails or rail sections 22, 23 and 24 are provided paralleling the curvature of the rail 2. They are attached at their ends respectively to frame member 7 and the plate rail 11. Rollers 25 are mounted on a shaft extending from the rail 2 to an angular bracket 26 mounted on the plate rail and passing through the rail 22. Other rollers 27 are mounted on a shaft extending between rails 2 and 23 and passing through rail 22. Still other rollers 28 are provided on a shaft extending between rails 2 and 24 and passing through rails 22 and 23. The rollers 28 may be considered as the start

of an exit branch conveyor leading to the right.

A similar construction of radially disposed rollers will be noted between rail 5 and the plate side rail 12. The set of rollers adjacent frame member 8 may be considered as the start of an exit conveyor leading to the left.

The plate 10 is also provided with a series of rollers which overlie it but are swiveled for movement as will hereinafter be described. The tops of these rollers extend above the plate side rails 11 and 12 and are at the same level as the tops of the rollers 13 and 17 which have already been described. The tops of the rollers located between the plate side rails 11 and 12 and the rails 2 and 5 respectively are at a slightly lower level. The reason for this is to provide against deflection by the last mentioned rollers of an article passing over the rollers mounted above the plate 10, when these rollers are set for straight-away operation, but where the article itself may have portions extending beyond the side edges of the plate 10.

An article moving along a conveyor and encountering supporting rollers having axes of rotation not perpendicular to its direction of motion but tilted with respect to that direction in a horizontal plane will be diverted thereby to the right or left. I make use of this principle in my switching means. But if a series of shiftable rollers is provided and it is desired to move the article smoothly in a curved path, successive sets of the shiftable rollers must have their axes shifted through progressively increasing angles. This also I accomplish in my device.

The sets of swiveled rollers mounted above the plate 10 have been designated by the numerals 29 to 36 inclusive. In my exemplary device I employ a clevis construction having a broad base 37 (Figure 5), upwardly bent arms 38 and 39 and a projection 40 on the base. The respective rollers 29 to 36 are mounted between the arms 38 and 39 of these clevis devices. The base of each clevis is provided with a fixed, downwardly extending stud or pivot member 41. The pivot members are adapted to extend through perforations 42 in the plate 10. They may be threaded and provided with nuts beneath the plate to prevent dislodgment. A stud 43 also extends downwardly from the arm 40 of each clevis and passes through an arcuate slot 44 in the plate 10. The studs 43 of the clevis device of each set of rollers above the plate 10 are interconnected by transverse links 45; and it will be evident that by moving these links transverse the plate 10, the swiveled rollers in each set may be concurrently shifted on their vertical axes 41.

The links 45 are pivoted centrally to a lever 46 lying beneath the plate and pivoted thereto at one end, as at 47. Pivoting means from the several links extend through slots in the lever 46. It will be evident that a movement of the lever 46 will move all of the links 45 concurrently and hence will concurrently shift the swiveled rollers on their vertical axes. But since the links for the various sets of rollers 29 to 36 are pivoted to the lever 46 at progressively increasing distances from the lever pivot 47, the amount of shifting of the links 45 progressively increases toward the upper end of the lever, and the amounts by which the swiveled rollers are shifted on their vertical axes will likewise progressively increase.

When the lever 46 lies parallel with the longitudinal axis of the plate 10, the sets of rollers 29 to 36 will lie with their horizontal axes perpendicular to that longitudinal axis, and will be so disposed as to carry an article supported by them over the plate 10 in a straight-away direction and in line with its longitudinal axis. This is shown in Figure 1. By shifting the lever 46 to the right or left, the axes of the swiveled rollers may be shifted to deflect articles to the right or left; but by reason of the differential shifting to which reference has been made, these rollers will be shifted so as to bring their horizontal axes into positions substantially radial to the rails 2 or 5 as the case may be. Hence, when the lever 46 is so shifted, articles received by my mechanism will be shifted smoothly to the right or left and brought into position to be received by those rollers, hereinabove described which lie between the rails 2 and 5 respectively and the plate rails 11 and 12. Thus such articles will be transferred to the right or left branch conveyors.

Various means may be adopted for controlling the position of the lever 46 and shifting it. This may be done manually or by power means made responsive to an operator or to automatic selecting or sorting means such as the electric eye. For the purpose of an exemplary showing, I have indicated a lever 48 for hand operation. This lever has an enlargement 49 at its end, which enlargement is pivoted centrally as at 50 to the rail 2. A link 51 is pivoted to the lever 46 and to the enlargement 49 in an eccentric position. Swinging the operating lever 48 about its pivot will thus shift the lever 46.

Locking means for the several positions are desirable and may be provided in a simple fashion. In Figure 6 I have indicated perforations 52 in the enlargement 49. In Figure 4 a locking rod 53 extends through the legs of the channel-shaped rail 2. A sleeve 54 may be attached to the lower leg to prevent misalignment of the rod when it is raised. A spring 55 engages between the upper leg of the rail and a pin or other abutment 56 on the rod 53, and urges the rod to a downward position in which its end can enter one of the perforations 52. Above the upper leg of the rail 2, I attach a member 57 to the rod which not only limits its downward movement but, extending beyond the rail 2, provides a means by which the rod may be lifted. The operator will lift this member with his finger while swinging the lever 48 on its pivot and, when the member 57 is released, locking will be accomplished as will be clear.

My device is self-contained and unitary. It may be made part of a permanent conveyor installation, but being light it is also adapted to be used with portable, demountable conveyor sections. It can be supported from a lower table in any desired way, and the type of portable, adjustable supports in use with portable conveyor sections may readily be employed for the purpose.

Modifications may be made in my structure without departing from the spirit of it. Having thus specifically described an exemplary embodiment of my structure, what I claim as new and desire to secure by Letters Patent is:

1. A switching device for a conveyor comprising a frame with portions for juxtaposition to an entering conveyor and to straight-away and to branch exit conveyors; a series of rollers for the support and movement of an article over said frame, said rollers being arranged in a plurality of parallel rows, each of said rollers being mounted in a member swiveled with respect to said

frame; and means for shifting the axes of said rollers so as to control the direction of movement of an article delivered to the device from an entering conveyor and cause it selectively to leave the device on one of the exit conveyors, said shifting means including a lever pivoted at one end to said frame, a link for each row of said rollers, each of said links being pivotally connected to each of the swiveled members in its respective row, and a pivotal connection between each link and said lever, said connections from said links to said lever being at progressively greater distances from the pivot for said lever, and means for moving said lever about its pivot.

2. A device according to claim 1 including other rollers mounted with axes fixed in said frame and located to one side of said series of rollers so as to receive an article delivered to said series of rollers from an entering conveyor and to deliver the article to an exit conveyor with a mode of motion aligned with the mode of motion of the exit conveyor.

3. A device according to claim 1 including a plate mounted in said frame and extending straight-away through the device, said series of rollers being mounted on said plate, and including other rollers mounted with axes fixed in said plate at an end thereof, said last mentioned axes being perpendicular to the mode of motion of the entering conveyor.

4. A device according to claim 1 including other rollers mounted with axes fixed in said frame and located to one side of said series of rollers so as to receive an article delivered to said series of rollers from an entering conveyor and to deliver the article to an exit conveyor with a mode of motion aligned with the mode of motion of the exit conveyor, and including a plate mounted in said frame and extending straight-away through the device, said series of rollers being mounted on said plate, and including still other rollers mounted with axes fixed in said plate at an end thereof, said last mentioned axes being perpendicular to the mode of motion of the entering conveyor.

5. A switching device for a conveyor comprising a frame with a portion at one end for juxtaposition to an entering conveyor and portions at the other end for juxtaposition to straight-away and branch exit conveyors, a plate extending straight-away through the device, rollers swiveled on said plate, means for shifting the axes of said rollers, other rollers with fixed axes journaled at the ends of said plate with their axes perpendicular to the edge of said plate, and still other rollers with fixed axes journaled offside said plate with their axes non-perpendicularly related to the edge of said plate, said shiftable rollers being mounted in supports having studs extending through said plate and journaled therein, said means for shifting comprising arms on said supports, a lever pivoted at one end to said plate, and linkage connections between said arms and said lever at progressively greater distances from said pivot, said frame having a side member extending away from said plate, an operating lever pivoted on said side member and a linkage connection between said operating lever and said first mentioned lever.

6. A switching device for a conveyor comprising a frame with portions for juxtaposition to an entering conveyor and to straight-away and to

branch exit conveyors; a series of rollers for the support and movement of an article over said frame, said rollers being mounted in members swiveled with respect to said frame; means for shifting the axis of said rollers so as to control the direction of movement of an article delivered to the device from an entering conveyor and cause it selectively to leave the device on one of the exit conveyors, said shifting means including a lever pivoted at one end to said frame, operative connections between said swiveled members and said lever, said connections to said lever being at progressively greater distances from its pivot point, and means for moving said lever about its pivot; and other rollers mounted with axis fixed in said frame and located to one side of said series of rollers so as to receive an article delivered to said series of rollers from an entering conveyor and to deliver the article to an exit conveyor with a mode of motion aligned with the mode of motion of the exit conveyor, the tops of said other rollers being at a lower level than the tops of said series of rollers.

7. A switching device for a conveyor comprising a frame with portions for juxtaposition to an entering conveyor and to straight-away and to branch exit conveyors; a series of rollers for the support and movement of an article over said frame, said rollers being mounted in members swiveled with respect to said frame; and means for shifting the axis of said rollers so as to control the direction of movement of an article delivered to the device from an entering conveyor and cause it selectively to leave the device on one of the exit conveyors, said shifting means including a lever pivoted at one end to said frame, operative connections between said swiveled members and said lever, said connections to said lever being at progressively greater distances from its pivot point, and means for moving said lever about its pivot; other rollers mounted with axis fixed in said frame and located to one side of said series of rollers so as to receive an article delivered to said series of rollers from an entering conveyor and to deliver the article to an exit conveyor with a mode of motion aligned with the mode of motion of the exit conveyor; and a plate mounted in said frame and extending straight-away through the device, said series of rollers being mounted on said plate; and still other rollers mounted with axis fixed in said plate at an end thereof, said last mentioned axis being perpendicular to the mode of motion of the entering conveyor, the tops of said second mentioned rollers being at a lower level than the tops of said series of rollers.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,835,823	Taylor	Dec. 8, 1931
2,105,922	Maltby	Jan. 18, 1938
2,136,267	Taylor	Nov. 8, 1938
2,268,895	Olson	Jan. 6, 1942

FOREIGN PATENTS

Number	Country	Date
63,896	Sweden	Oct. 4, 1927