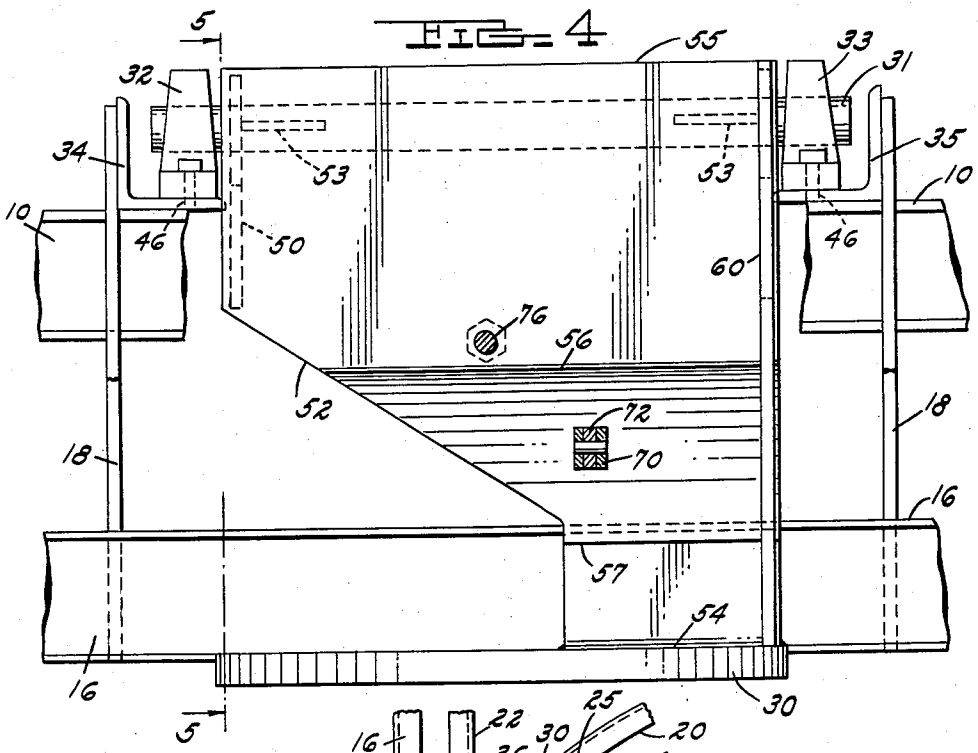
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PIVOTING PLATE SWITCH FOR DOUBLE RAIL CONVEYOR TRACKS

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FIG. 4



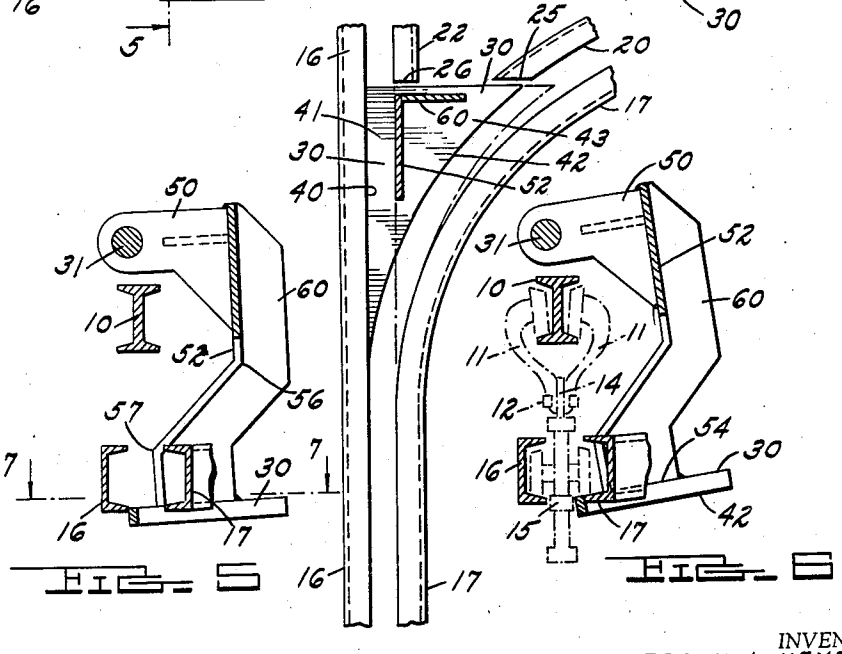


FIG. 5 FIG. 6

FIG. 7

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FIG. 1

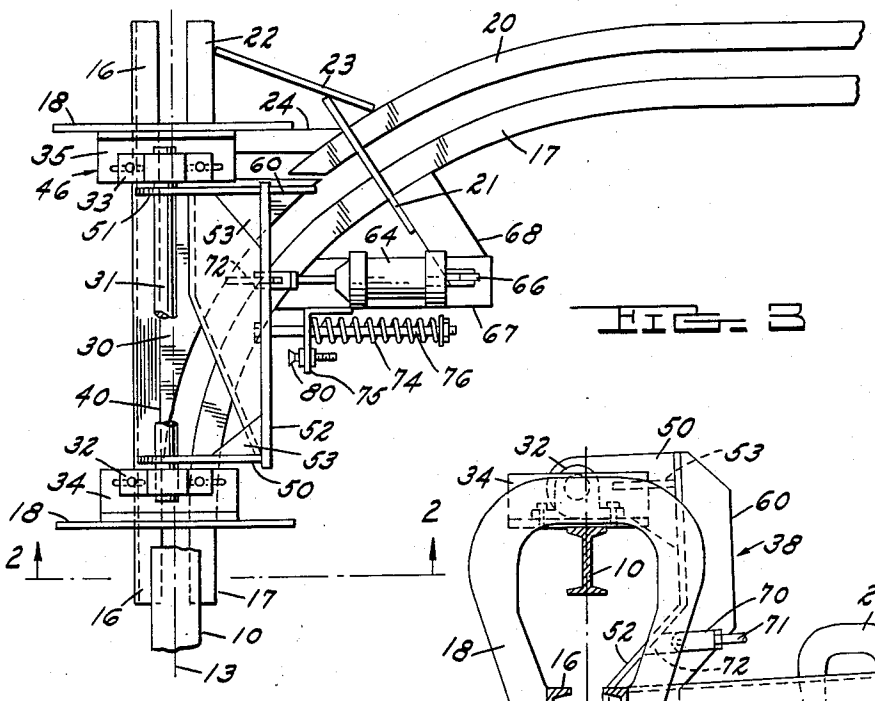
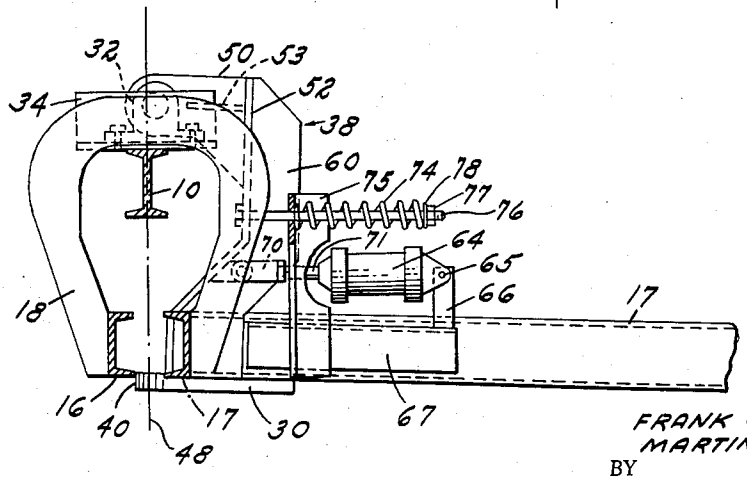


FIG. 3

FIG. 2



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PIVOTING PLATE SWITCH FOR DOUBLE RAIL CONVEYOR TRACKS

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Application November 29, 1956, Serial No. 625,044

10 Claims. (Cl. 104—101)

This invention relates to a switch for use with double rail conveyor trackways, i. e. trackways comprised of a pair of parallel rail members, laterally spaced to form an intermediate slot. The switch consists of a single tongue member mounted on a pivotal axis which extends parallel to one path of the trackway, and movable about this pivotal axis in an amount substantially equal to the width of the slot between rail members of the trackway.

A switch point, or location where alternate paths of travel are provided, is defined by forming one rail member of the trackway along one path of travel, and the other rail of the trackway along another. In other words, at the switch point the two continuous rail members of the trackway gradually diverge from each other, and the two paths of travel thus formed are completed by installing a new rail member for each.

The switch construction of the invention provides a plate-like, movable switch tongue which completes the trackways at the switch point by forming a rail surface between either of the non-continuous rail members and either of the continuous rail members. Structure forming a pivotal axis is located above the trackway, and the tongue member is suspended from this structure. The pivotal axis is located in a plane parallel to the plane of the trackways and the pivotal axis extends in a direction which may be generally defined as the path of travel of one trackway entering the switch point. Generally, a switch is either right or left hand, with one main trackway extending in a straight line, and a branch trackway diverging from this straight line to the right or to the left thereof. In such case, the pivotal axis is located above and parallel to the main trackway.

The extent of pivotal movement of the switch tongue member is determined by the width of the slot between the rail members of the trackway. Means are provided for moving the tongue member about the pivotal axis between one switch position and another, these means comprising a device for normally biasing the tongue member to one position, or for positively moving the switch tongue member from one position to another, or a combination of both.

Preferably, an adjustable mounting is provided for the structure which defines the switch pivotal axis permitting the axis to be positioned slightly to one side or the other of the normal mounting line defined by the center of the appropriate trackway. This permits the switch tongue member to take up a position approximately in the plane of a branch trackway which is sloped to provide gravity feed away from or into the main trackway.

In conveyor work the switch construction will be most frequently used in installations where the double rail trackway is positioned below and intermediate the center line of a conventional single I-beam trackway. The I-beam trackway supports trolleys of an endless driven conveyor chain which acts to propel load carrying trolleys supported by the lower double rail trackway. The upper I-beam track defines the main path of travel. Switches are employed at points where the load carrying

trolleys may be diverted onto branch lines, or feed in from branch lines, these branch lines usually being of the gravity type. In this type of installation, the switch pivotal axis structure is supported on the upper I-beam track so that the switch tongue will be suspended from this track along with the rail members of the double rail trackway which conventionally are so suspended. The switch actuating structure is preferably supported by one of the rail members of the double rail trackway. As a result all components of the switch are tied into the track structure.

Other features and advantages of the invention will appear from the following description of a presently preferred embodiment thereof illustrated in the accompanying drawings which comprise the following views:

Fig. 1, a plan view of the switch construction including rail members of the double rail trackway. In this view an upper I-beam track member on which the switch is mounted is shown, but is broken away at the switch point for the sake of clarity;

Fig. 2, an end elevation of the switch structure shown in Fig. 1 taken along the line 2—2 thereof. In this view the switch is shown arranged for gravity feed away from the main line;

Fig. 3, an end elevation, but showing the switch arranged for gravity feed into the main line. In this view the switch actuating mechanism has been eliminated;

Fig. 4, an enlarged side elevation of the switch taken from the right side of the structure of Fig. 1. For the sake of clarity, the upper I-beam track is broken away, the inner rails of the lower trackway and the actuating mechanism have been omitted.

Fig. 5, a sectional elevation taken along the lines 5—5 of Fig. 4. In this view the switch is installed in the manner indicated in Fig. 3, and the switch tongue is shown in branch line position;

Fig. 6, a view corresponding to Fig. 5 with the switch tongue shown in main line position; and

Fig. 7, a sectional plan view along the lines 7—7 of Fig. 5.

Referring to Figs. 1 to 3, the conveyor installation shown includes an upper I-beam rail **10** which serves as a track for trolleys **11** (Fig. 6) of a conventional overhead conveyor installation. Supported from trolleys **11** is a continuous chain **12** (Fig. 6), whose center line and path of travel is indicated by the broken line **13** in Fig. 1. Pusher attachments **14** (Fig. 6) are carried by at least certain of the trolleys **11** for propelling load carrying trolleys, generally indicated by the reference **15**, along a double rail trackway located below the track **10**.

The double rail trackway is formed by two channel section rail members **16** and **17** supported from the track **10** by U-shaped hangars **18**. As shown in Fig. 1, a switch point is formed in the double rail trackway by the right track member **17** gradually diverging in a curved path from the left track member **16** which continues in a straight line, following the path of the upper track member **10**. Track member **17** thus forms part of a branch line trackway, which is completed by a complementary track member **20**, and these two track members **17** and **20** are supported by yokes **21** on the branch line. The main line trackway is completed after the switch point by a second track member **22**. Suitable braces **23** and **24** (Fig. 1) may be employed to interconnect track members **20** and **22** near their ends **25** and **26**, respectively, which are adjacent the switch point (Fig. 7).

The switch provided for this switch point is an assembly consisting of a switch tongue **30**, a pivot shaft **31** carried between a pair of bearings **32** and **33** which are mounted on supporting brackets **34** and **35** respectively, and a tongue hangar **38**, of composite construction, which

supports the tongue 30 from the pivot shaft 31. The construction of these component parts will be more thoroughly described.

Tongue 30 is a plate member of generally triangular shape (see Fig. 7). One edge 40 is straight to correspond with the path of the main line trackway. Edge 40 and the upper flat surface of the plate 41 bordering this edge form a portion of the plate which provides a rail surface between rail members 17 and 22 when the plate is in the position shown in Fig. 6 and indicated in phantom in Fig. 7. Intersecting edge 42 of the plate 30 is curved to complement track member 17, and, together with the adjacent upper surface 43 of the plate, forms a rail portion between the end 25 of track member 20 and track member 16, as shown in Figs. 5 and 7.

Mounting brackets 34 and 35 for the pivot shaft bearings 32 and 33 are angle section members which each rest upon the upper surface of the I-beam track member 10 and against a vertical face of one of the track hangars 18, and are suitably secured in place. Each mounting bracket 34 and 35 is provided with a pair of slotted holes 46, and each pivot shaft bearing 32 and 33 is secured to its mounting bracket by suitable fastening elements engaging these slotted holes. The mounting brackets 34 and 35 are positioned so that the slotted holes permit the centers of the bearings 32 and 33 to be located on or to either side of the center line of the tracks which is represented in Fig. 1 by the broken line 13, and in Figs. 2 and 3 by the broken line 48.

The tongue hangar 38 includes a pair of identical arms 50 drilled to engage the pivot shaft 31, to which they are secured adjacent each end thereof. A downwardly and inwardly extending plate member 52 is secured to the free end of each of the arms 50, with a triangular gusset 53 (Fig. 1) being attached to each of the arms 50 and 51 and the plate 52. The lower edge 54 of plate 52 is much shorter than the upper edge 55 thereof as can be seen in Fig. 4, and is secured to the upper surface of the switch tongue 30. Plate member 52 is bent along lines 56 and 57 (see Fig. 4) so that it extends downwardly, inwardly and again downwardly into attachment with the switch tongue 30. A brace member 60, shaped to conform to the vertical configuration of plate 52, is secured perpendicularly to the right hand face thereof, as the parts are viewed in Fig. 6, the line of attachment of this brace member being approximately aligned with the attachment of arm 51 to the opposite face of the plate (Fig. 1). The lower edge of brace 60 is also connected to the upper face of switch tongue 30 at right angles to the connection of plate 52 therewith, as best shown in Figs. 6 and 7.

Mechanism for pivoting the switch tongue 30, and its supporting structure including the pivot shaft 31, about the axis defined by the pivot shaft bearings 32 and 33 comprises (Figs. 1 and 2) an actuating cylinder 64 pivotally attached at 65 to a post 66 supported by a pair of angle members 67 and 68 which are secured to track member 17 and to each other. A clevis 70 on the rod 71 of this cylinder is pivotally connected to a lug 72 attached to the face of the switch tongue support plate 52. The actuating cylinder illustrated is of the one way type—when operated it acts to move the swtich tongue to the branch line position shown in Fig. 1. When fluid pressure is removed from the cylinder 64, the switch is returned to main line position by a spring 74 reacting against a vertical angle member 75 attached to angle member 67, upon a bolt 76 through a nut 77 and washer 78. Bolt 76 is connected to the switch tongue supporting plate 52.

Switch movement to main line position is limited by contact between the face of supporting plate 52 and a stop 80 (Fig. 1), adjustably mounted on the vertical angle member 75. Stop 80 is adjusted so that the switch tongue 30 comes to rest in main line position without severe contact between edge 42 of the tongue and rail member 17 such as would cause peening of the tongue. Branch line position of the tongue 30 is established by contact between tongue edge 40 and rail member 16.

With the type of conveyor installation shown, load carrying trolleys 15 usually move along a branch line by gravity, the branch line being sloped to feed the load carrying trolleys either away from or into a main line. The present type of switch construction is particularly advantageous for these conditions, since it may be mounted to complement the slope of the branch line.

Fig. 2 illustrates the switch assembly mounted to "feed out" to a branch line sloped away from the main line. Switch pivot shaft bearings 32 and 33 have been positioned along the slotted mounting holes 46 in their supporting brackets 34 and 35 so that the center of the axis of pivot shaft 31 is located to the right of the center 48 of the trackway. Thus, when the switch is moved to branch line position, switch plate 30, which is mounted at right angles to a vertical line passing through the center of the pivot shaft 31, has moved beyond this vertical line when its edge 40 contacts the edge of track member 16, causing the switch plate 30 to be canted with the slope of the branch line.

Likewise, as illustrated in Fig. 3, when the switch is mounted to "feed in" from a branch line sloped toward the main line, the pivot shaft bearings 32 and 33 are positioned so that the axis of the pivot shaft is to the left of the center 48 of the trackway, causing the switch plate 30 to slope in the opposite direction and corresponding to the slope of the branch line when its edge 40 is in contact with track member 16.

Thus, the switch itself can be used to assist in feeding a trolley into or out of a branch line—a great advantage in conveyor installations where gravity is relied upon to move a trolley off a main line in time to clear a following trolley, or onto a main line in time to meet an empty pusher member.

As compared with horizontally slidable or vertically pivoted switches commonly employed in conveyor work, the present switch offers great advantages in simplicity of construction, ease of operation and time of operation. Only a few degrees of rotation of the pivot shaft 31 accomplishes movement of the switch tongue from one position to another, and the stroke of an actuating cylinder required for this movement is less than the distance travelled by the switch tongue transversely of the trackway to an extent which depends upon the point of attachment of the actuating cylinder to the switch assembly. In the construction illustrated the stroke of the actuating cylinder is approximately two-thirds the travel of the switch tongue.

A further advantage of the construction is that it permits a very rigid track layout at a switch point.

Modifications of this construction to adapt the principles hereof for other configurations of track junctions are considered to be within the capability of those skilled in this art. Such modifications as well as others included within the scope of the following claims are to be considered part of the present invention.

While preferred embodiments have been described above in detail, it will be understood that numerous modifications might be resorted to without departing from the scope of our invention as defined in the following claims:

We claim:

1. A switch for use with a composite conveyor track having an upper track member for trolleys which support an endless driven member and a main lower double rail trackway suspended below the upper track for supporting load carrying trolleys which are propelled along the lower track by movement of the driven member and are movable out of the path of the upper track at a switch point for travel along a branch double rail trackway; said switch comprising a generally triangular plate-like tongue member having one edge portion shaped to form a section of one rail of said main trackway, and

an intersecting edge portion shaped to form a section of one rail of said branch trackway, a switch pivot shaft, means supporting said pivot shaft above said upper track for pivotal movement on an axis lengthwise of said upper track, tongue member suspending structure secured to said shaft and extending laterally, downwardly and inwardly around one side of said upper track into connection with said tongue member within the area bounded by the rail forming portions thereof, and actuating means for pivoting said tongue member and suspending structure about said axis between main line and branch line positions.

2. A conveyor track switch according to claim 1 further characterized by said pivot shaft supporting means including means for adjustably positioning said pivot shaft transversely relative to a vertical plane passing through the center of said main line trackway.

3. A switch construction for a trackway of the type formed by a pair of rail members laterally spaced to provide an intermediate slot comprising a switch tongue having intersecting rail portions thereon, structure defining a pivotal axis extending longitudinally of said switch tongue, and supporting means for securing said switch tongue to said structure in spaced relation to said pivotal axis and with the plane of the rail portions of said switch tongue parallel to said pivotal axis, said supporting means being rigidly secured to said switch tongue within the area bounded by the said rail portions thereof, and means for moving said switch tongue and supporting means about said pivotal axis an amount substantially equal to the width of said slot.

4. A switch construction according to claim 3 wherein the said structure defining a pivotal axis comprises a pair of bearings, supporting members therefor, and means for adjustably positioning said bearings on said supporting members in a direction transversely to said pivotal axis.

5. A switch construction according to claim 4 wherein said tongue supporting means includes a shaft carried by said bearing and means connecting said switch tongue to said shaft for rotation therewith.

6. For use in a conveyor installation of the type having an upper track for trolleys supporting an endless propelling member and a lower track for independently supporting load carrying trolleys, the lower track being formed by a pair of rail members laterally spaced to provide an intermediate slot; an improved switch construction for a switch point on said lower track formed by the divergence of one of the rail members thereof from the other, comprising a switch tongue having intersecting rail forming portions thereon, means mounting said switch tongue for movement in a direction transverse to one path of travel to said switch point, said mounting means including structure defining a pivotal axis extending parallel to said one path of travel and located above said lower track, and supporting means for securing said tongue to said structure for movement about said pivotal axis in an amount substantially equal to the width of said slot.

7. A conveyor switch construction according to claim 6 wherein said structure defining a pivotal axis includes a pair of bearings, bearing support means, and means for adjustably positioning said bearings on said bearing support means whereby the center of said pivotal axis can be moved transversely relative to the longitudinal center of said upper track.

8. A conveyor switch construction according to claim 7 wherein said supporting means includes a pivot shaft carried by said bearing, and means connecting said switch tongue to said pivot shaft in vertically spaced relation therewith, said connecting means extending laterally, downwardly and inwardly from said pivot shaft around said upper track into rigid connection with said switch tongue within the area bounded by the rail forming portions thereof.

9. A switch construction according to claim 8 further characterized by the provision of actuating means carried by one of the diverging rail members of said lower track, and means connecting said actuating means to said switch at a location radially intermediate the center of said pivot shaft and said switch tongue.

10. A switch for use at a junction between a main double rail conveyor trackway and a branch double rail trackway which is sloped for gravity propulsion of trolleys therealong, said switch comprising a generally triangular plate-like tongue member having one edge portion shaped to form a section of one rail of said main trackway and an intersecting edge portion shaped to form a section of one rail of said branch trackway, a switch pivot shaft, means for supporting said pivot shaft above said main trackway for pivotal movement on an axis lengthwise thereof, tongue member suspending structure secured to said shaft and extending downwardly into connection with said tongue member within the area bounded by the rail forming portions thereof, means for pivoting said tongue member and suspending structure about said pivotal axis between main line and branch line position, and said pivot shaft supporting means including means for positioning said shaft so that the plane of the rail surfaces of said tongue member substantially conform to the slope of said branch line when said tongue member is in branch line position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,373,637 Riblet ..... Apr. 5, 1927