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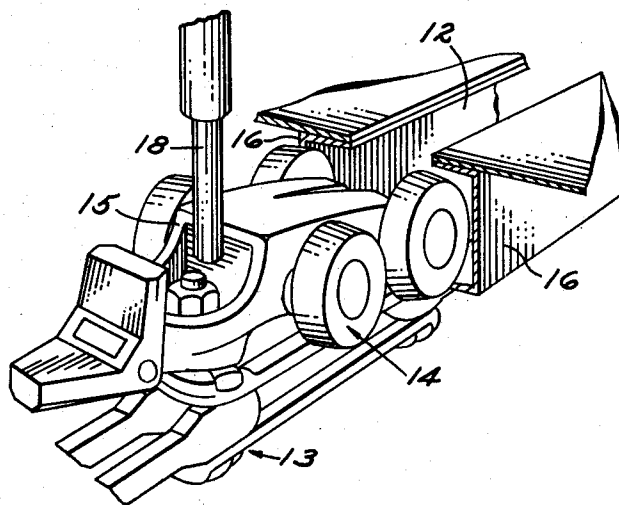
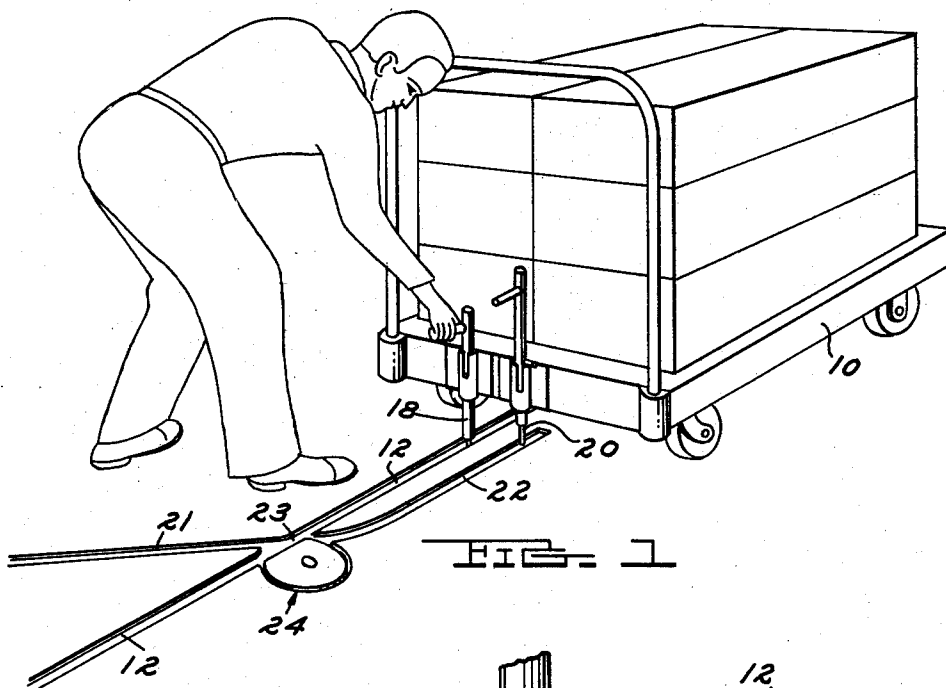
C. A. DEHNE

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CROSS-OVER DEVICE FOR DRAGLINE SYSTEMS

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3 Sheets-Sheet 1



INVENTOR.

CLARENCE A. DEHNE

BY

Farley, Forster & Farley

ATTORNEYS

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C. A. DEHNE

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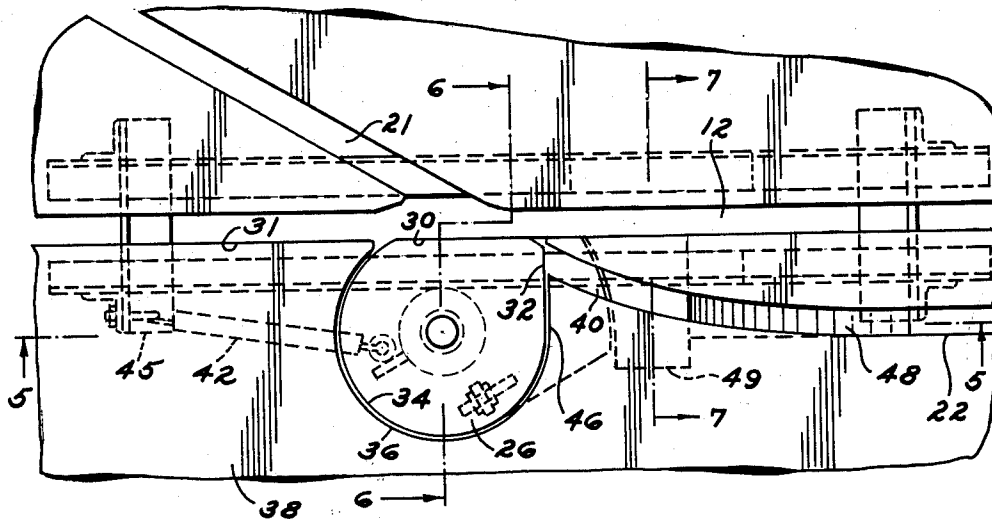


FIG. 3

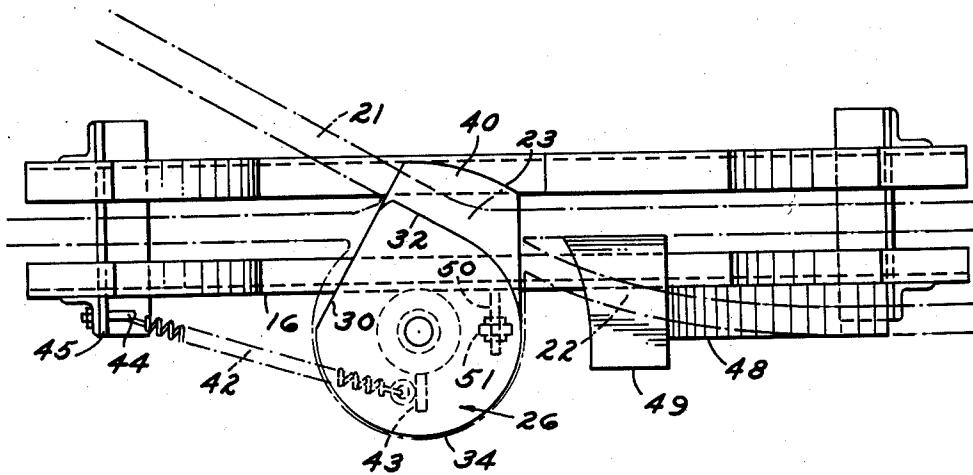


FIG. 4

INVENTOR.

CLARENCE A. DEHNE

BY

Farley, Forster & Farley

ATTORNEYS

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CROSS-OVER DEVICE FOR DRAGLINE SYSTEMS
 Clarence A. Dehne, Garden City, Mich., assignor to Jervis
 B. Webb Company, Detroit, Mich., a corporation of
 Michigan

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This invention relates to a device for conveying the drive pin of a carrier of a dragline system, travelling in a path defined by one guide slot, across propelling means travelling below another guide slot at an intersection between the two guide slots.

One example of the utility of the present invention lies in multiple pin switching systems which include a main line guide slot having propelling means travelling therebelow, one or more diverging branch line guide slots, and wherein the carrier may be diverted onto a branch line by engaging one carrier drive pin in the branch line guide slot while withdrawing a second main guide pin from the main line drive slot. An inexpensive switching arrangement is thereby obtained as long as all branch lines simply diverge in the same direction from the main line. The present invention enables the advantages of this type of switching to be obtained in a case, where it is necessary to cross the branch line over the main line in order to have it diverge in the direction desired.

Broadly, the invention provides a cross-over device which enables a carrier drive pin, advancing along a branch line, to be conveyed across the propelling means of a main line at a crossing between the drive slots of the two lines, and consists of a cross-over member provided with a horizontal drive pin supporting portion or ledge which is located below the guide slots and above the main line propelling means. This cross-over member is mounted for movement from a first position in which the pin supporting ledge extends into the path of a drive pin advancing along the branch line to a second position in which the pin supporting ledge extends across the propelling means of the main line. Suitable means are employed for normally urging the cross-over member to the first position, together with means for moving the cross-over member from the first to the second position in response to advancing movement of a drive pin in engagement with the pin supporting portion.

In preferred form, the device consists of a plate-like cross-over member which is mounted so as to form a portion of the carrier supporting surface on a vertical axis adjacent the crossing between the main and branch line guide slots for pivotal movement between first and second positions. The cross-over member has a vertical drive pin abutment surface which in the first position of pivotal movement extends across the branch line guide slot in the path of a pin advancing therealong. A pin supporting ledge is provided below this abutment surface and above the main line propelling means and is disposed in advance of the abutment surface in the direction of drive pin travel along the branch line toward the intersection. Means are provided for guiding the approaching drive pin onto the pin supporting ledge of the cross-over member for engagement with the abutment surface thereof so that further advancing movement of the drive pin is accompanied by pivotal movement of the cross-over member about its axis to the second position in which the pin supporting ledge extends across the main line propelling means and the abutment surface is no longer disposed in the path of drive pin movement, thus allowing the drive pin to slide across the propelling means on the pin supporting ledge of the cross-over member. Means are included for normally urging the cross-over member to the

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first position thereof so that it is self-returning after having acted to convey a drive pin across the main line.

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

FIGURE 1, a perspective view showing a drive pin equipped carrier approaching an intersection between main and branch line guide slots incorporating the device of the invention;

FIGURE 2, a perspective view showing a conventional construction of drive line, including the guide slot and propelling means, and relation between the propelling means and a drive pin;

FIGURE 3, a plan view of the intersection between main and branch lines illustrated in FIG. 1, and showing the cross-over member of the invention in the first position thereof;

FIGURE 4, a plan view similar to FIG. 3 except that the carrier supporting surface has been removed, and showing the cross-over member of the invention in the second position thereof;

FIGURE 5, a sectional elevation taken as indicated by the line 5-5 of FIG. 3 and including a lowered branch line drive pin approaching the intersection;

FIGURE 6, a sectional elevation taken as indicated by the line 6-6 of FIG. 3 showing the relative positions of the main and branch drive pins of a carrier passing through the intersection on the main line; and

FIGURE 7, a sectional elevation taken on the line 7-7 of FIG. 3 and indicating the relative positions of the main and branch line drive pins of a carrier passing through the intersection on the branch line.

The components of a conventional dragline system are shown in FIGS. 1 and 2 and include a wheeled floor supported carrier or truck 10 which is propelled in a path defined by a main line guide slot 12 by propelling means consisting of an endless chain 13 which is secured at spaced intervals to trolleys 14 equipped with a pusher member 15 and travelling in tracks 16 below the guide slot 12 so that the pushers 15 are adapted to engage a main line drive pin 18 lowered through the guide slot, the drive pin being carried on the front of the truck as shown in FIG. 1.

The cross-over device of the invention is illustrated in its application to a multiple drive pin switching system wherein the truck 10 is equipped with a second drive pin 20 which can be engaged in a branch line guide slot 21 having an initial portion 22 which extends parallel to the main guide slot 12 and then crosses the main line at the intersection 23. Switching is accomplished by raising the main line drive pin 18 to disengage it from the guide slot 12 and lowering the branch line drive pin 20 to engage it in the initial portion 22 of the branch line guide slot, and in FIG. 1 this operation is illustrated as being performed manually, although in actual practice mechanisms are employed for automatically raising the main drive pin and lowering the branch drive pin. Movement of the truck along the branch line guide slot takes place when it is pushed from behind by a following truck being propelled along the main line.

In switching systems of this type it has been necessary to arrange all branch lines in the same relation to the main line with regard to the direction in which they diverge, the branch lines all including merely an initial portion which extends parallel to the main line and a following portion which diverges toward the side of the main line on which the parallel portion of the branch line is placed. The present invention permits branch lines to be arranged in any diverging direction desired without fur-

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ther complicating the drive pin mechanism by providing a cross-over device which acts to convey the branch line drive pin across the main line guide slot and propelling means in any instance where it is necessary or desirable to diverge the branch line in a direction opposite to the side of the main line on which its parallel portion is placed.

This cross-over device is generally designated by the reference 24 in FIG. 1 and is shown in detail in FIGS. 3-7. The device consists of a cross-over member 26 equipped with a depending stub shaft 27 which is mounted adjacent the intersection 23 between the main and branch guide slots 12 and 22 on a pivotal axis defined by a collar 28 secured to a main track member 16 for pivotal movement between a first position shown in FIG. 3 and a second position shown in FIG. 4. The cross-over member has a straight side wall portion 30, which, when the cross-over member is in its first position, forms a portion of the side wall 31 of the main line guide slot 12; a vertical abutment surface 32 which, when the cross-over member is in its first position, extends across the branch line guide slot 22 and which in the second position of the cross-over member forms a portion of the side wall of the branch line guide slot extending across the main line guide slot. These wall portions 30 and 32 are connected by an arcuate wall portion 34 and the cross-over member 26 is mounted within a complementary shaped recess 36 cut in a plate 38 which forms a portion of the carrier supporting surface, with the plane of the upper surface of the cross-over member lying in the plane of this supporting surface.

The cross-over member further includes a drive pin supporting ledge 40 which is disposed below the abutment surface 32 and above the level of the main line propelling means which is defined by the elevation of the tracks 16. As shown in FIG. 5, a slight dip is formed in these tracks at the crossing so that the drive pin supporting ledge 40 may extend across the tracks and the propelling means in the second position thereof shown in FIG. 4.

A spring 42 is secured to a bracket 43 on the cross-over member and anchored at 44 to a track supporting member 45, and acts to normally urge the cross-over member to the first position thereof in which the abutment surface 32 extends across the branch line guide slot 22, the portion 46 of the plate aperture 36 which is adjacent to the abutment surface 32 serving as a stop to define this position.

A drive pin 20 advancing along the branch guide slot portion 22 is guided onto the pin supporting ledge 40 of the cross-over member by an upwardly inclined ramp member 48 and a shelf member 49, it being understood that a drive pin is conventionally urged downwardly by gravity or other suitable means and is free to move upwardly.

The cross-over device is self-acting in operation. Once a drive pin 20 advancing along the branch line guide slot portion 22 has been lifted and deposited on the drive pin supporting ledge 40 of the cross-over member as shown in FIG. 5, further advance of the carrier moves the drive pin 20 into engagement with the abutment surface 32 of the cross-over member which then pivots from its first position to its second position as the carrier advances. During this pivotal movement of the cross-over member 26, the drive pin 20 is supported on the ledge 40 and thus conveyed across the main line propelling means. Also during this pivotal movement of the cross-over member, the abutment surface 32 serves to guide the pin 20 through the intersection 23, acting as a bridge across the main guide slot between the branch guide slot portions 22 and 21. An adjustable stop 50 mounted on a bracket 51 depending from the cross-over member 26 engages a rail member 16 to define this second position of the cross-over member, as shown in FIG. 4.

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Frictional contact between the pin and the cross-over member surfaces 40 and 32 retains the cross-over member in the second position until the pin moves off the pin supporting ledge 40. The cross-over member is then returned by the spring 42 to its first position in which the main line guide slot 12 is unobstructed.

While the cross-over device has been illustrated in its application to a multiple pin switching system, it is to be understood that the application of the device to dragline systems is not limited to this particular use and that modifications within the scope of the following claims are to be considered as part of the invention. The terms "main line" and "branch line" are used for convenience only, "main line" designating the line whose propelling means must be crossed by a drive pin travelling on an intersecting "branch line."

I claim:

1. A cross-over device for use at the intersection between main and branch guide slots of a dragline system for conveying the drive pin of a carrier travelling in the branch slot across propelling means travelling below the main slot, said cross-over device comprising a cross-over member, means mounting the cross-over member adjacent the intersection of the guide slots for movement between first and second positions, said cross-over member having a drive pin abutment surface which in said first position of movement extends into the path of travel of a drive pin advancing toward said intersection in said branch slot, said cross-over member having a drive pin supporting ledge below said abutment surface and above said propelling means, said supporting ledge being disposed in advance of said abutment surface in the direction of travel of said drive pin towards said intersection, means normally urging said cross-over member to said first position, and means for guiding said advancing drive pin onto said supporting ledge for engagement with said abutment surface whereby further advancing movement of said drive pin in contact with said abutment surface is accompanied by movement of said cross-over member from said first to the second position thereof in which said pin supporting ledge extends above and beyond said propelling means.

2. A cross-over device according to claim 1 further characterized by said abutment surface forming a side wall of said branch slot across said intersection when said cross-over member is in the second position thereof.

3. A cross-over device according to claim 1 wherein said cross-over member mounting means comprises supporting structure, means connecting said cross-over member to said supporting structure for oscillating movement on an axis substantially perpendicular to the plane of the surface in which said guide slots are formed.

4. A dragline system having a main line guide slot formed in a carrier supporting surface and propelling means travelling therebelow, and a branch line guide slot formed in said supporting surface and crossing the main line guide slot, a cross-over device for conveying a lowered carrier drive pin engaging the branch line guide slot across the main line propelling means comprising a cross-over member, means mounting said cross-over member for movement between first and second positions, said cross-over member having an abutment surface which in said first position extends across the branch line guide slot in the path of movement of a drive pin travelling therealong toward such crossing, said cross-over member also having a pin supporting ledge located below said abutment surface and above said propelling means, said pin supporting ledge being disposed in advance of said abutment surface in the direction of movement of a drive pin approaching the crossing on said branch line, said pin supporting ledge extending over and beyond the path of said propelling means in the second position of said cross-over member, means normally urging said cross-over member to the said first position thereof, and means for leading an advancing drive pin in said branch line guide

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slot onto said pin supporting ledge of the cross-over member for engagement with said abutment surface thereof whereby further advancing movement of said drive pin is accompanied by movement of said cross-over member to the second position thereof.

5. A dragline system according to claim 4 wherein said cross-over member is mounted with its upper surface in the plane of said supporting surface, the pin supporting ledge of said cross-over member extending below said supporting surface.

6. A dragline system according to claim 4 further characterized by stop means defining the said first and second positions of said cross-over member.

7. In a dragline system of the type in which drive pin equipped carriers are propelled along a supporting surface in a path defined by a main line guide slot by propelling means travelling therebelow and having a branch line guide slot which intersects and crosses said main line guide slot; a cross-over device for conveying the drive pin of a carrier advancing along the branch line over the main line propelling means comprising a cross-over member, means mounting the cross-over member adjacent and in advance of the intersection on a vertical axis for pivotal movement between first and second positions, the cross-over member having an upper surface which forms part of the carrier supporting surface, the cross-over member having one vertical side face which in the first position of cross-over

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member pivotal movement forms a portion of one side wall of the main guide slot, said cross-over member having a vertical abutment surface which in the first position of cross-over member pivotal movement extends across the branch line guide slot and which in the second position of pivotal movement forms a portion of the side wall thereof, the cross-over member having a drive pin supporting ledge disposed below the abutment surface and above the propelling means, the supporting ledge being disposed in advance of the abutment surface when the cross-over member is in its first position and extending over the propelling means when the cross-over member is in its second position, means normally urging the cross-over member to the first position thereof, and means for directing a drive pin advancing on the branch line onto the pin supporting ledge of the cross-over member for engagement with the abutment surface thereof whereby further drive pin advancing movement is accompanied by pivotal movement of the cross-over member from the first to the second position thereof to convey the advancing drive pin over the propelling means while supported on the ledge of the cross-over member.

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