

April 14, 1931.

E. R. EDSON

1,800,722

RAILWAY CROSS-OVER

Filed Dec. 15, 1927

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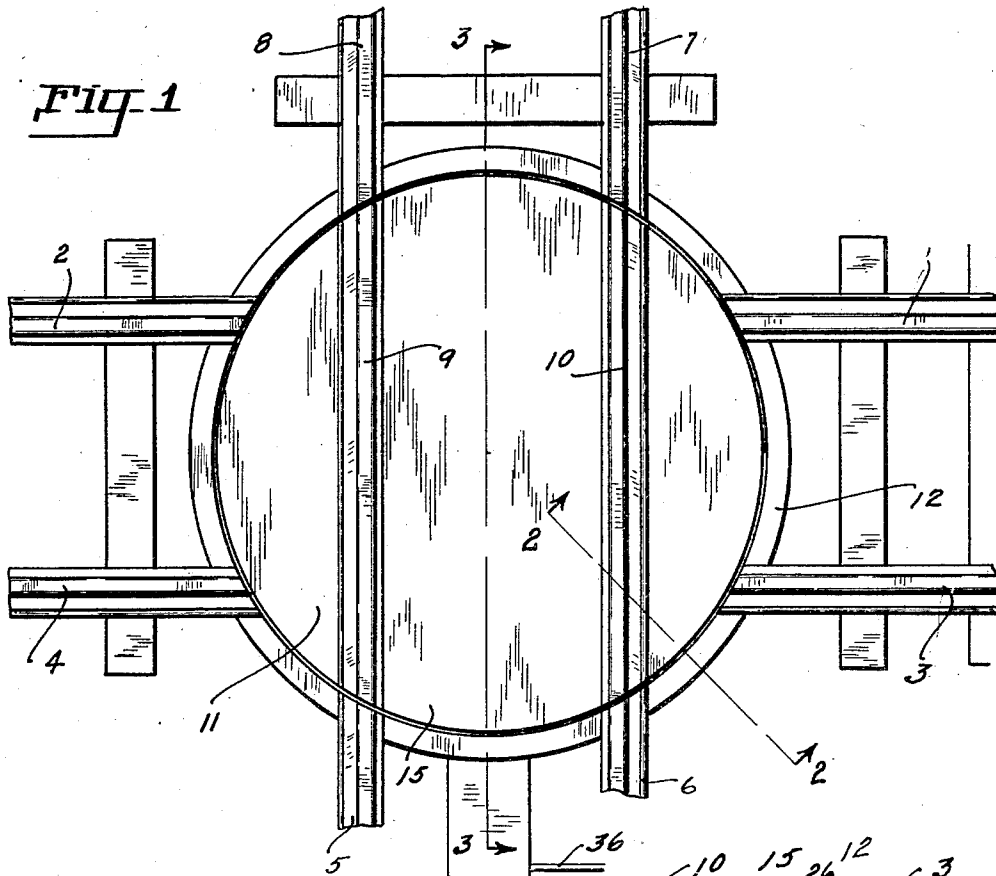
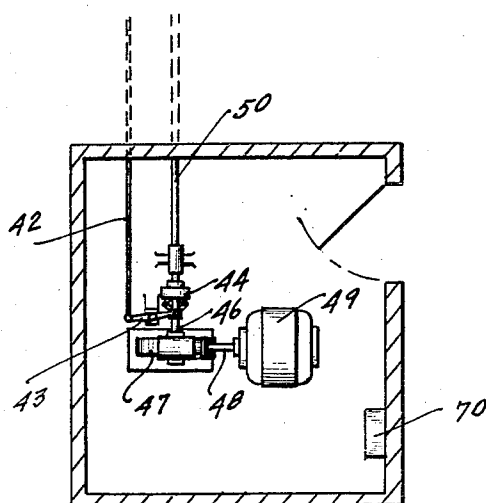
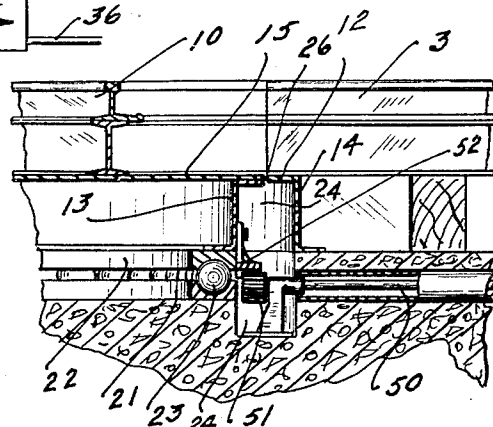


Fig 2

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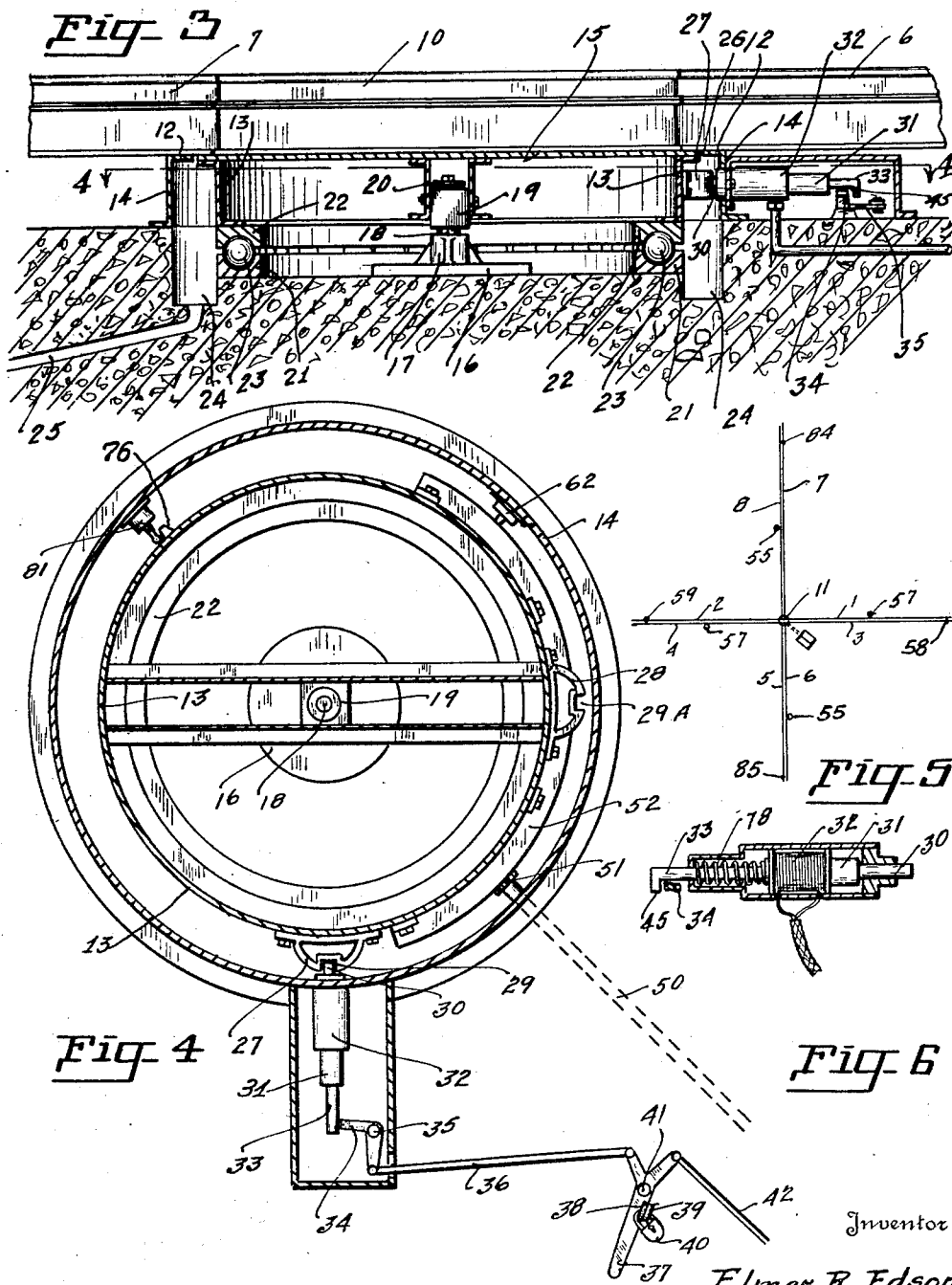
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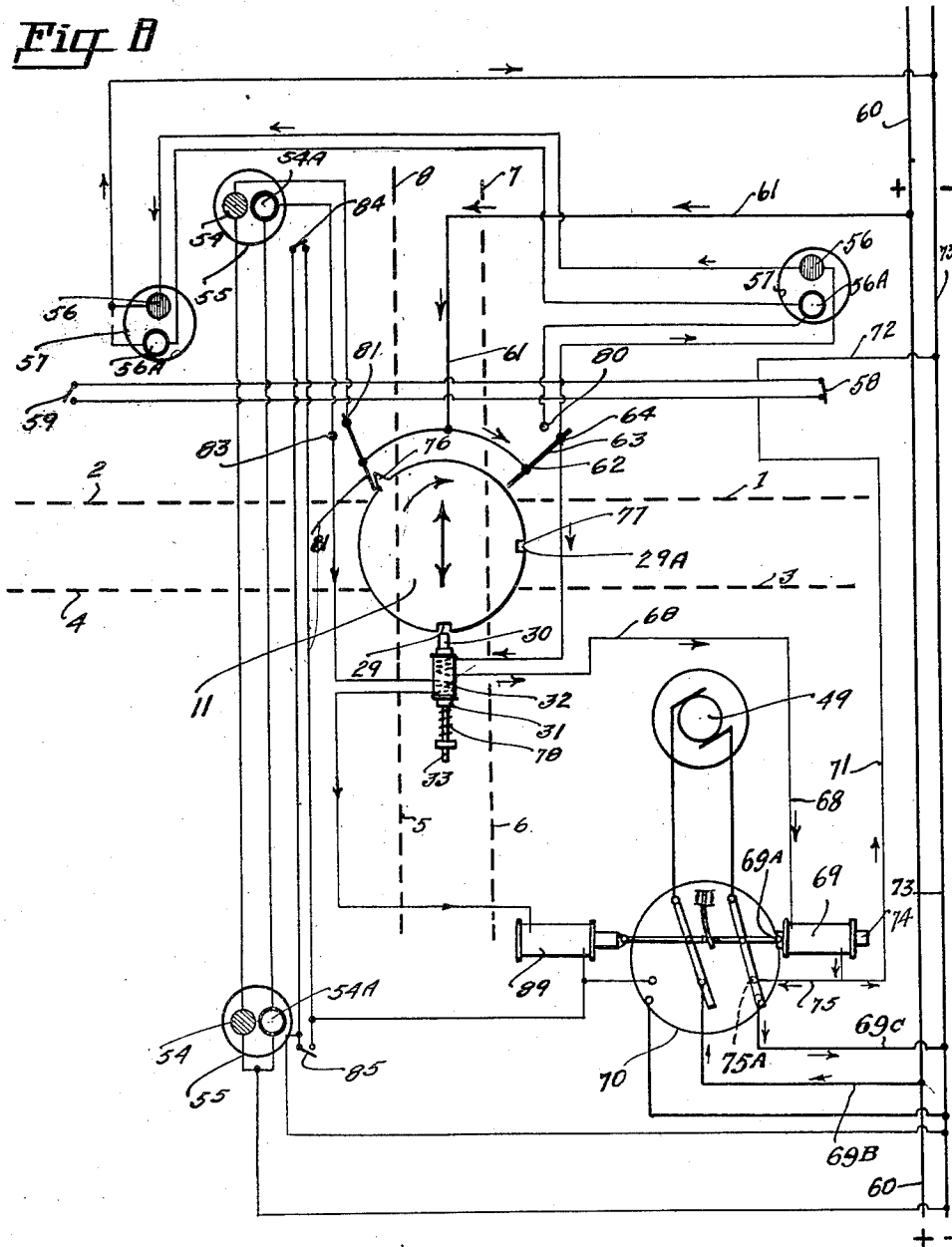
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3 Sheets-Sheet 3

Fig 8



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UNITED STATES PATENT OFFICE

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RAILWAY CROSSOVER

Application filed December 15, 1927. Serial No. 240,164.

My present application relates to my pending applications in the United States Patent Office, filed concurrently under date of April 18, 1927 upon a switching device, Serial Number 184,685, upon a railway roadbed and track construction, Serial Number 184,686 and upon a railway switch Serial Number 184,687.

My present invention relates to railway cross-over devices and is particularly adapted to being utilized in track and roadbed construction, as evidenced by the pending applications referred to above.

The primary purpose and object of the invention consists in placing at the crossing of main line tracks an automatic turn-table cross-over that is adapted to being actuated by automatic means set in motion by an electrically operable device disposed in the line of travel of a vehicle over the line. When said device is actuated the same is adapted to set the cross-over disposed in the line of travel of the vehicle in readiness for the passage of the vehicle thereover.

A further object of my device consists in placing an electric signal in the path of the line of travel of a vehicle over the automatic cross-over adapted to indicate the position of the cross-over both before and after the same is placed in readiness to be passed over by the vehicle.

And still further objects of my invention consists in elements disposed in an automatic cross-over making it adapted to manual manipulation.

Other objects of my present invention consists in simple and efficient means adapted to the purposes intended, that may be safely utilized in track construction for the operation of trains at relatively high speeds and that may be used over relatively long periods without the same getting out of order or repair.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment of which is hereinafter shown with reference to the draw-

ings which accompany and form a part of this specification:

In the drawings—

Fig. 1 is a top, plan view of one of my assembled devices disposed at the intersection of two tracks crossing at relatively right angles to each other.

Fig. 2 is a fragmentary, sectional view, taken on line 2—2 of Fig. 1, looking in the direction indicated.

Fig. 3 is a sectional, side view, the same being taken on line 3—3 of Fig. 1, looking in the direction indicated.

Fig. 4 is a sectional, plan view, the same being taken on line 4—4 of Fig. 3, looking in the direction indicated.

Fig. 5 is a plan view of a cross-over disposed in a main line track and made to illustrate the indicators disposed upon each of the approach tracks to the cross-over and adapted to indicate the position of the switch at two locations on each track before the vehicle reaches the point of the cross-over disposed within the track.

Fig. 6 is a detailed, sectional view of the locking and unlocking element adapted to electric manipulation disposed within the cross-over device and adapted to lock the device, or unlock the same to permit of the rotation of the track elements.

Fig. 7 is a top, plan view, of the power house showing the electric motor and the actuating elements extending therefrom and adapted to actuate the cross-over into such position that its rails will be in continuous alignment with the rails on which the approaching vehicle is travelling.

Fig. 8 is an electrical, diagrammatical layout of the electrical elements adapted to actuate the electric means for positioning the automatic railway cross-over.

Like reference characters refer to like parts throughout the several views.

In the drawings, I have illustrated two main line tracks intersecting each other at right angles with track of the same material and size of rails, with the rails of each track numbered respectively as 1, 2, 3, 4, 5, 6, 7 and 8, with the rails 9 and 10 being disposed upon the turntable 11 of the cross-

over. A circumferential shield 12 being disposed circumferentially of the turntable and adapted to support the terminal ends of each of the main line rails and also being further adapted to maintaining the turning structure in a relatively weather and dust proof condition. I preferably form the outer rim of the turntable of a Z bar 13, and the rim 12 of a Z bar 14. A plate 15 forms the upper surface of the turntable and upon which the track elements are superposed. A base block 16, forms a turntable support for the cross-over elements and a bearing 17 is disposed central thereof into which a spindle 18 is disposed, the same extending upward and about which the collar 19 is journaled; the locking washer 20 being disposed on the upper end thereof and being further adapted to maintain the collar 19 positioned relative to that of the spindle. To facilitate the ease of movement of the cross-over element as a whole, I form raceways 21 and 22 of annular members sufficiently heavy for the character of transervice to be transferred thereover and place a multiplicity of balls 23 therein to facilitate the ease of movement of the associated elements. The base raceway 21 may be made homogeneous with the base block 16 where the units to be transported over the cross-over are relatively heavy or where the vehicles to be transported thereacross are to be run at relatively high rates of speed. An annular passageway 24 is disposed around the cross-over and a drain 25 is disposed at the low point of the same which is adapted to the draining of the passageway and to the ventilation of the same. The annular passageway 24 is preferably placed in registerable alignment with the opening 26 disposed between the outer edge of the plate 15 and the annular Z bar 12 so that any moisture or foreign matter will readily clear the oppositely disposed faces of the meeting elements and will drop, or drain into the passageway. Locking lugs 27 and 28 are disposed on the outer periphery of the Z bar 13. These locking lugs each have a locking space 29 disposed therein that is in registerable alignment with the locking plunger 30 disposed in the inner end of the core 31 of the solenoid 32. The outer end 33 of the core of the solenoid is adapted to being actuated through the medium of the bell crank 34. The bell crank 34 is journaled about the supporting pin 35, and a pull rod 36 is disposed between the bell crank 34 and the bifurcated lever 37. The lever 37 has an upstanding lug 38 disposed thereupon in registerable alignment with the locking bar 39 and when it is desired the hand operating switch apparatus may be locked in placed position by the placing of the lock 40 within the engaging locking elements, as illustrated in Fig. 4. The solenoid

core is also adapted to electrical manipulation. The bifurcated lever 37 is pivotally disposed upon a journal stand 41. A throw-out link 42 is disposed between the arm of the bifurcated lever 37 and the link 43, illustrated in Fig. 7. The link 43 is adapted to engage and disengage a clutch 44, so that when the lever 37 is in locked engagement, the clutch 44 is engaged and the bell crank 34 is out of engagement with the locking lip 45 of the end 33 of the plunger, in which position the solenoid core is adapted to electrical manipulation. The clutch 44 is the connecting element disposed between the drive shaft 51 and the power shaft 46, leading from the reduction gear 47 to which the motor shaft 48 of the electric prime mover 49 is connected. The driving shaft 50 has disposed upon its oppositely disposed end a pinion 51 that is adapted to coast with an annular gear rack 52 disposed upon the outer peripheral edge of the cross-over elements, as illustrated in Fig. 2, so that when the motor is energized the cross-over will be turned. The prime mover is a reversible motor, so that when the cross-over is to be manipulated for engagement with one of the pair of tracks, the motor will run clockwise; when it is to be manipulated for engagement with the tracks crossing the aforesaid mentioned ones the same will run counterclockwise.

For a more detailed description of electrical manipulation of the elements, reference is had to Fig. 5 and Fig. 8. In Fig. 8 rails 5, 6, 7 and 8 are shown as being in direct alignment with the rails 9 and 10 on the turntable 11 and are indicated as clear tracks by green lights 54 which are a part of signal 55; at the same time red lights 56 which are a part of signals 57 indicate that the rails 1, 2, 3 and 4 are not in direct alignment with rails 9 and 10 or turntable 11 but meet a blocked cross-over; consequently there is a break in their continuity.

In order to position the cross-over in direct alignment with tracks 1, 2, 3 and 4 the turntable 11 must be unlocked and turned ninety degrees in the direction of the arrow as shown in Fig. 8 and again in position for rails 1, 2, 3 and 4 to be in direct alignment with rails 9 and 10 disposed on the turntable 11. Immediately upon the locking of the turntable and the clearing of rails 1, 2, 3 and 4, the signals 57 will change from red to green and will indicate that the cross-over has been cleared for any vehicle disposed on rails 1, 2, 3 and 4. The signals 55 will change from green to red and therefore indicate that rails 5, 6, 7 and 8 are blocked. Before any change in signals will take place the turntable 11 must be at the extreme end of its travel and in locked position, and when the turntable is at the extreme end and in locked position, the lug

76 disposed at its peripheral edge will contact either switch 62 or 81 depending upon the position the turntable is in and which will in turn light up the signals 55 and 57 as above outlined.

A more specific outline of the operation and coordination of the rotation of the turntable, the locking of the turntable and the lighting of the signals is shown on Fig. 8. A vehicle upon either of the four tracks will first close either of the rail contacts 58 or 59 which will close the electric circuit and allow the current to flow from the main supply line 60 and the conductor 61 in the direction shown by the arrows to switch 62 and thence through the switch bar 63 and to contact 64 and then to solenoid 32. When the current reaches the solenoid 32 core 31 is pulled out of the notch 29 of turntable 11 which unlocks the turntable 11. This operation is completed and almost simultaneously the electric current which first flowed in the solenoid 32 will flow through the conductor 68 into solenoid 69 and thereby pull the core 69A which is connected to the reverse switch 70. When this is done the current is permitted to pass through the conductor 69B from main line 60 and then through the reverse switch 70 into reversible motor 49 and it thereby energizes the motor in the direction desired to rotate the turntable 11 in the direction of the arrow, as shown in Fig. 8. The current then passes from the motor 49 through the reverse switch 70 into conductor 69C and main line 73. Contact 58 is only closed momentarily; therefore a means must be provided to energize core 69 after switch 58 is opened; this is done by a contact 75A which closes a shunt circuit 75 which passes through solenoid 69 and then the reverse switch 70 and through conductor 69C and finally into the main line 73 where electric currents must be closed until the turntable has completed its travel.

When the turntable has reached the end of its travel the lug will engage and throw the switch bar 63 out of contact with the contact point 64 thereby breaking the above described electric circuit thus releasing the solenoid core 31 permitting the same to engage the notch 29A through the action of the tension spring 78.

When the lug 76 throws the switch bar 63 it makes a closed circuit through the contact point 80 and the green lights 56A within their respective signals are lighted. The closing of the rail switches 58 and 59 will have no electrical effect on the system while the switch bar 63 is disconnected through the action of the lug 76, while tracks 1, 2, 3 and 4 are closed.

Referring to Fig. 8: When the turntable 11 begins to revolve in the direction indicated, the lug 76 allows the switch bar

81 to break the circuit and the green lights 54A will be lighted through the contact point 83 in the signals 55, and close the contact 83 so that when either the rail contacts 84 and 85 are closed the turntable will be revolved in the opposite direction returning it to the position shown in the drawings.

When the contacts 84 and 85 are closed, the only difference in the cycle of operation is that the solenoid 89 reverses the motor 49 by pulling the reverse direction to that of solenoid 69.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein shown and described, as it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow:

What I claim is:

1. A cross-over disposed at the intersection of two sets of tracks comprising a turntable element of a Z shaped circumferential bar, a circular plate superposed the Z shaped bar, a set of raceways in registerable alignment with each other and adapted to support the turntable element, and a base element centrally disposed at the turntable and having an upwardly extending spindle about which the turntable element is adapted to being rotated in either direction.

2. A cross-over disposed at the intersection of two sets of tracks comprising, a turntable element of a Z shaped circumferential bar, a circular plate superposed the Z shaped bar, a set of raceways in registerable alignment with each other, ball bearings disposed therebetween, said ball bearings adapted to support the turntable element, and a base element centrally disposed below the turntable and having an upwardly extending spindle about which the turntable element is adapted to being rotated in either direction.

3. A cross-over disposed at the intersection of two sets of tracks comprising, a turntable element of a Z shaped circumferential bar, a circular plate superposed the Z shaped bar, a set of raceways in registerable alignment with each other having ball bearings disposed therebetween and adapted to support the turntable element, a base element centrally disposed the turntable and having an upwardly extending spindle about which the turntable element is adapted to being rotated in either direction, and means for so rotating it, including locking lugs disposed at suitable positions about the outer periphery of the Z bar having a locking space disposed in registerable alignment with locking plungers.

4. A cross-over disposed at the intersection of two sets of tracks comprising, a

turntable element of a Z shaped circumferential bar, a circular plate superposed the Z shaped bar, a set of raceways in registerable alignment with each other having ball bearings disposed therebetween and adapted to support the turntable element, a base element centrally disposed the turntable and having an upwardly extending spindle about which the turntable element is adapted to being rotated in either direction, means for so rotating it, including locking lugs disposed at suitable positions about the outer periphery of the Z bar having a locking space disposed in registerable alignment with locking plungers, an annular passageway circumferentially disposed about the turntable element in registerable alignment with an opening disposed between the outer edge of the Z shaped bar and the outer frame structure.

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