Nov. 26, 1935. W. H. WHALEN 2,021,905

RAILWAY CROSSING

Filed July 30, 1932 4 Sheets-Sheet 1

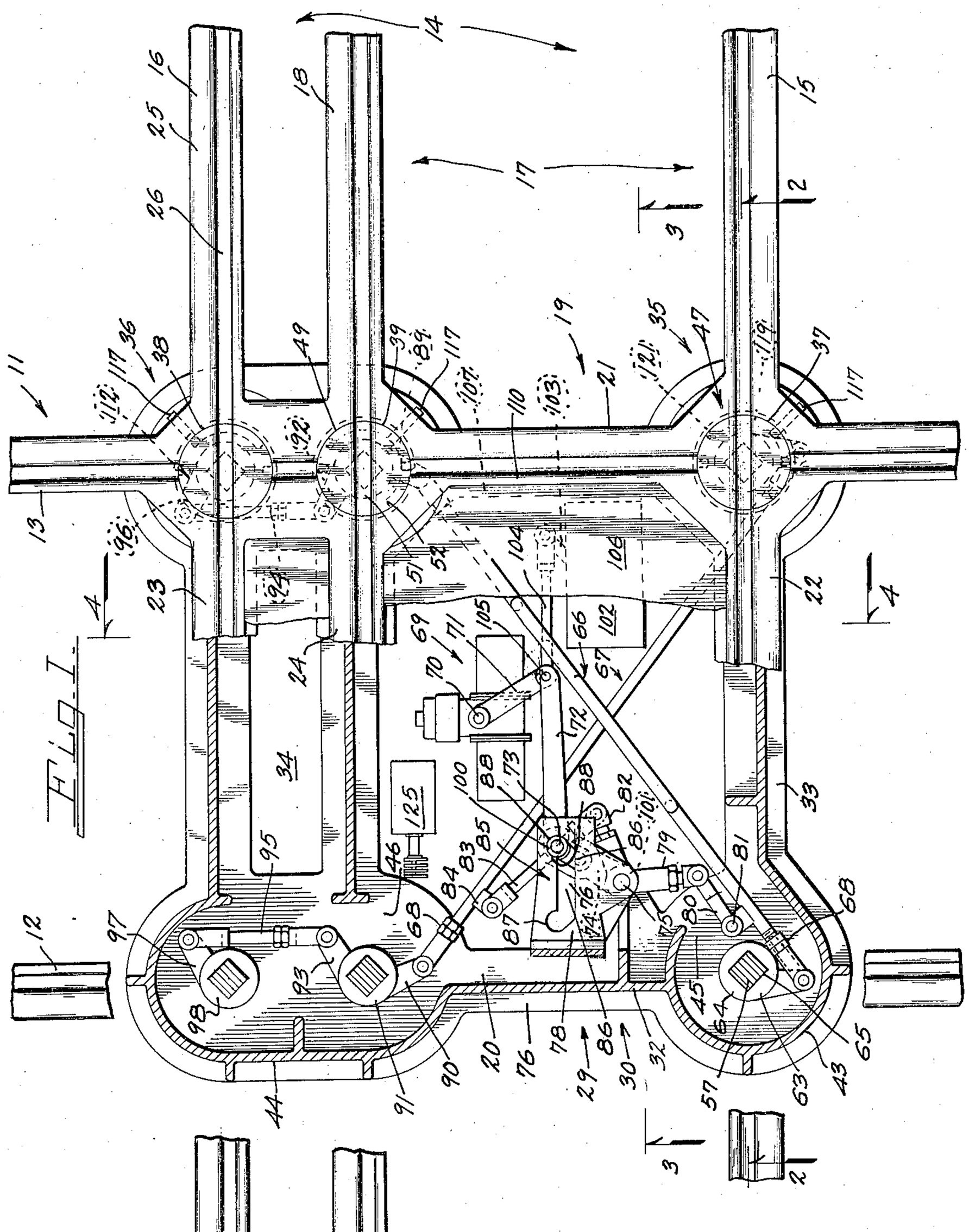

FIG. 1.

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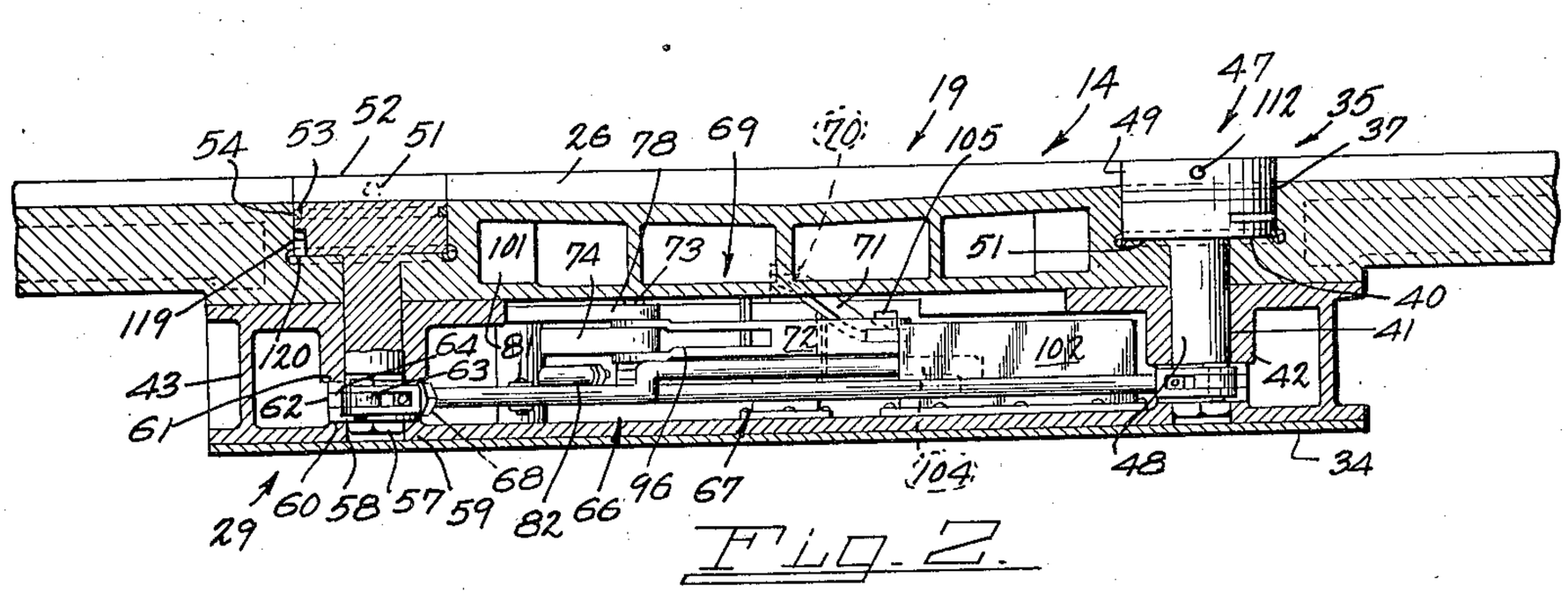

FIG. 2.

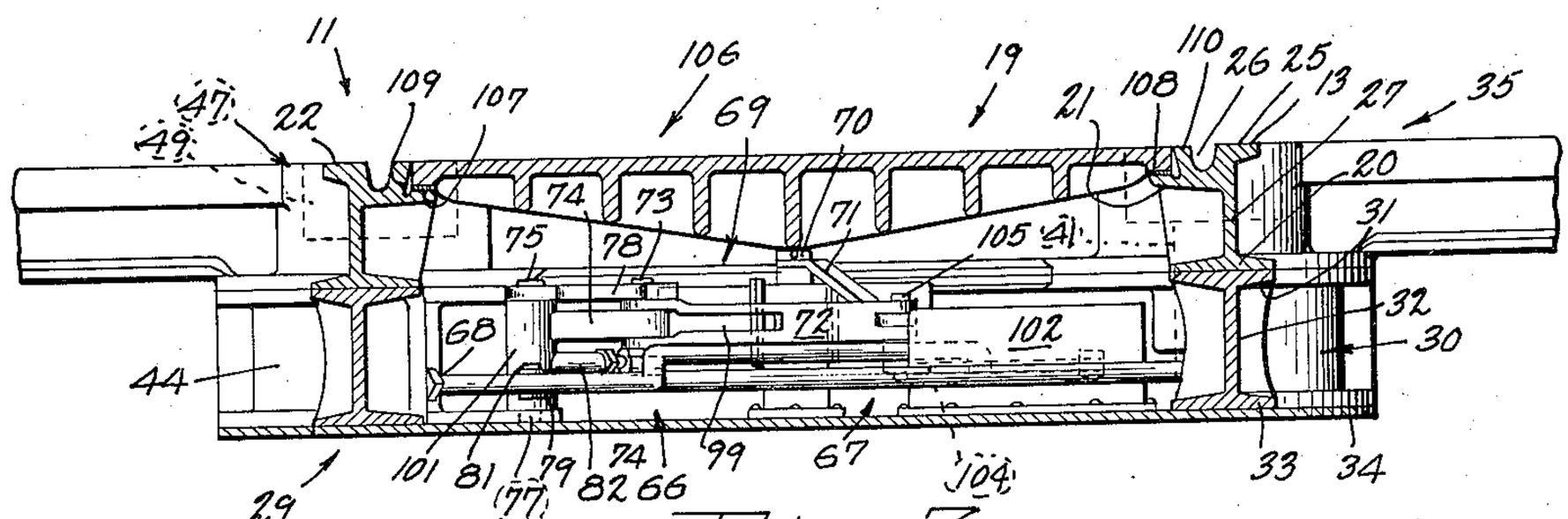

FIG. 3.

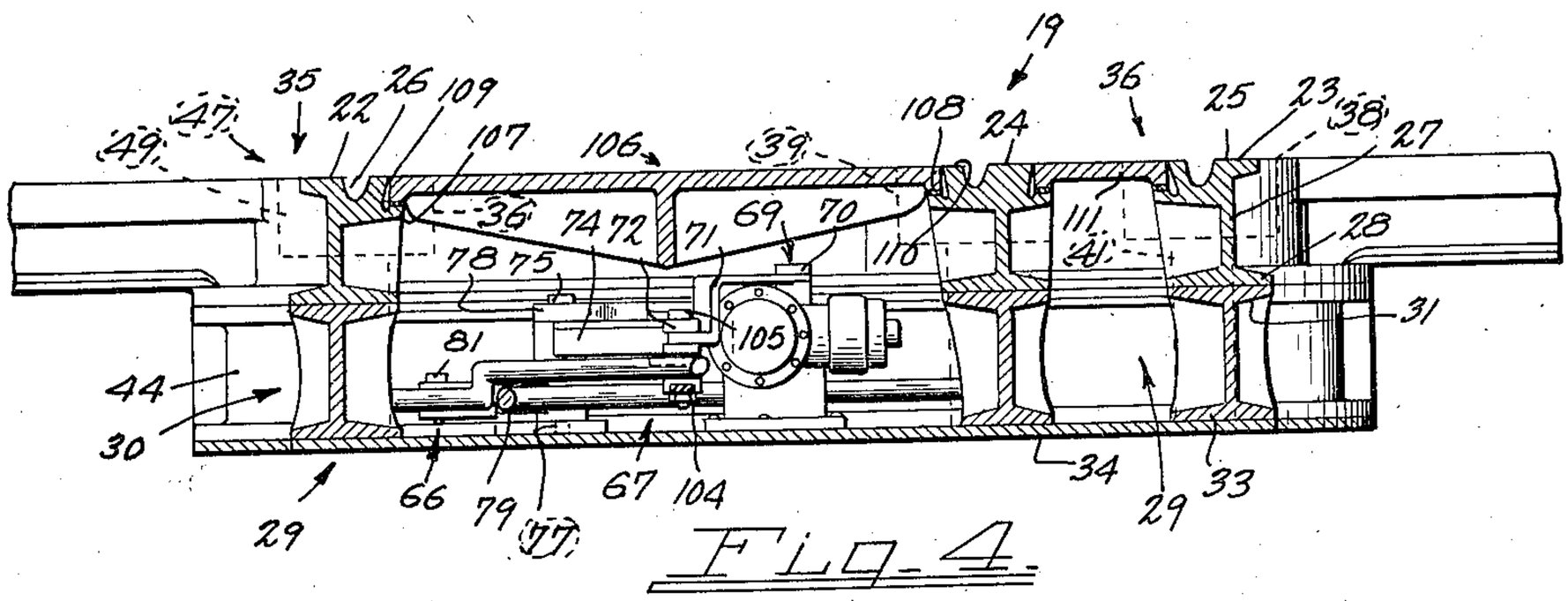

FIG. 4.

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RAILWAY CROSSING

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Fig. 5.

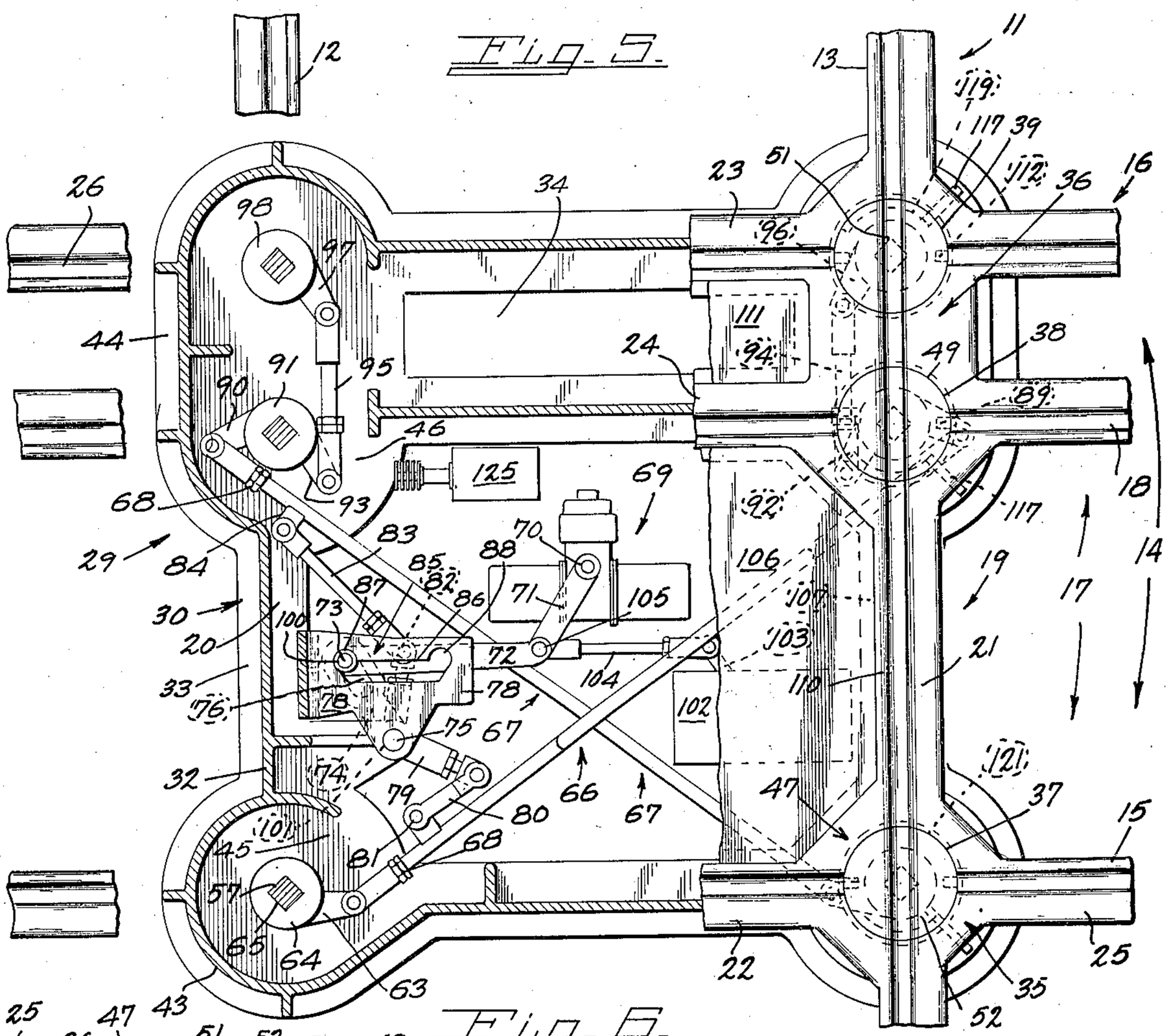


Fig. 6.

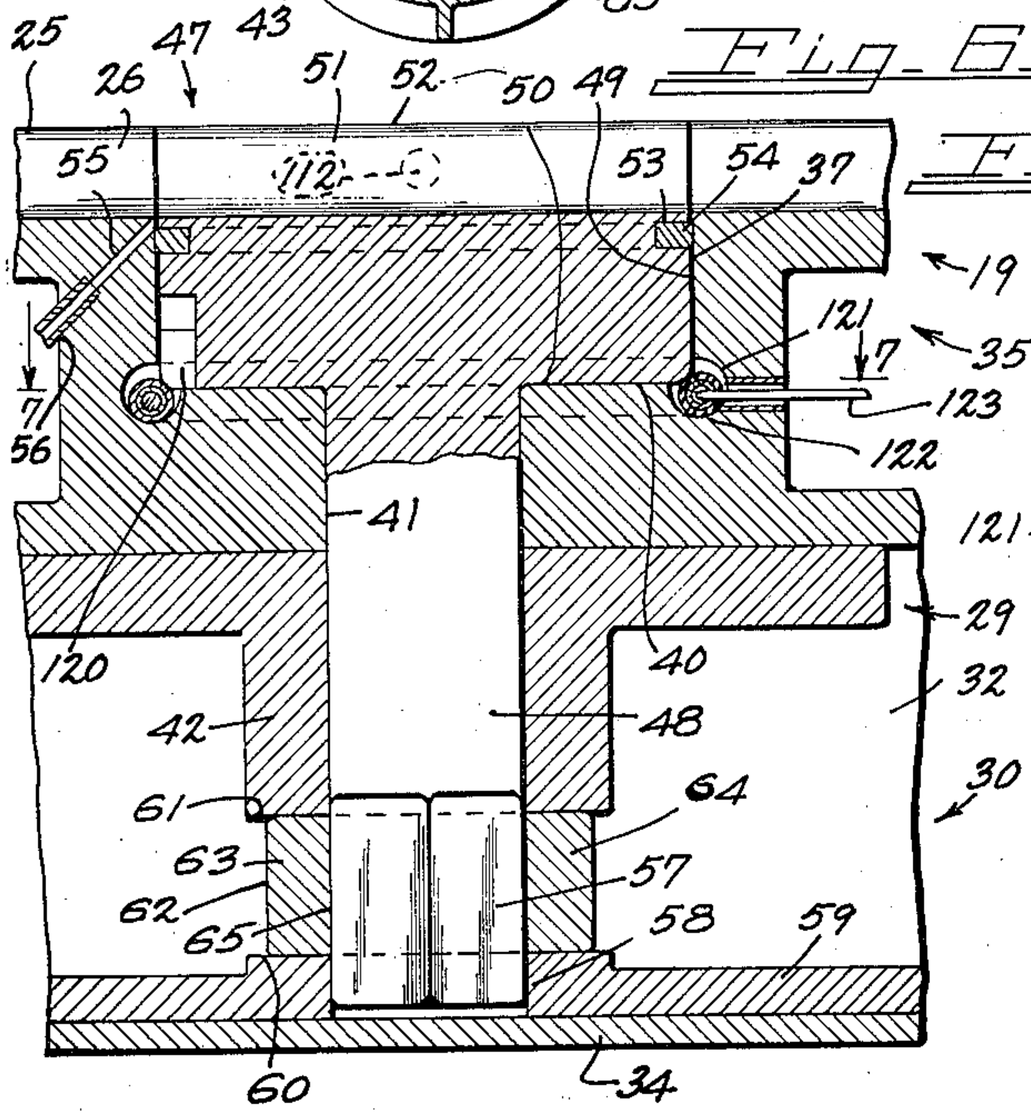
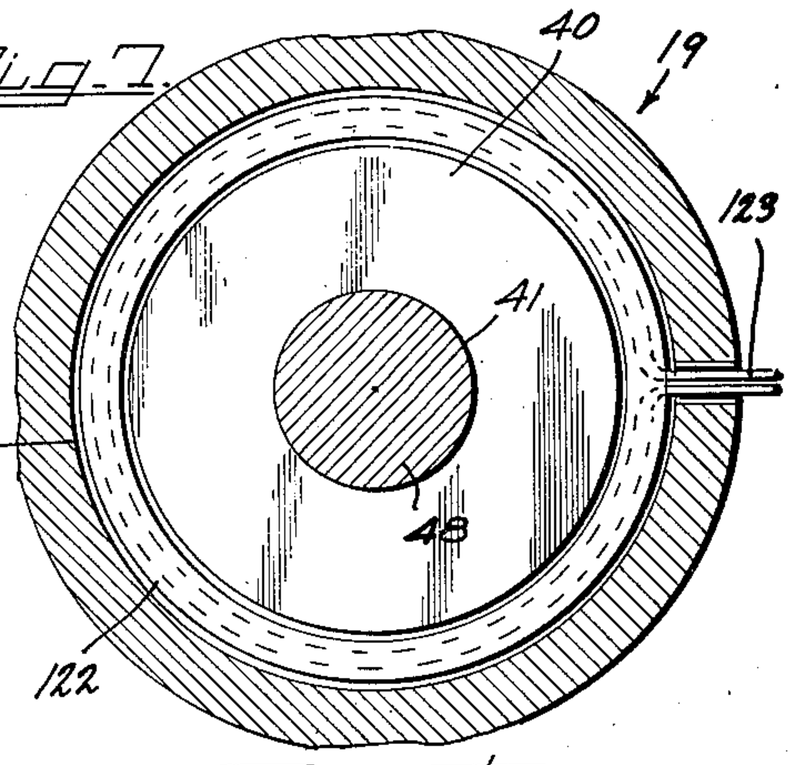


Fig. 7.



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RAILWAY CROSSING

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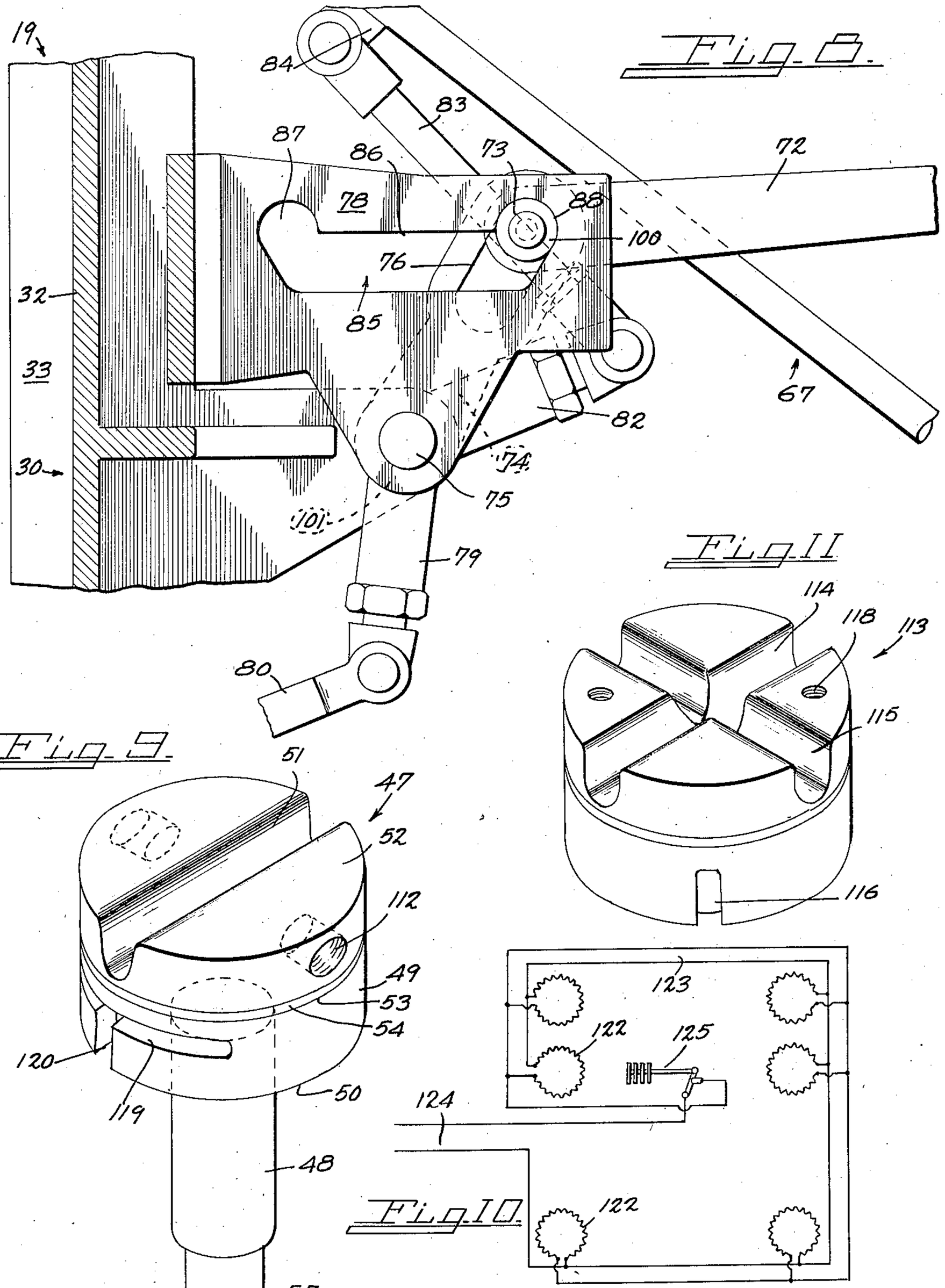

Fig. 8.

Fig. II

Fig. 9.

Fig. 10.

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Patented Nov. 26, 1935 2,021,905

UNITED STATES PATENT OFFICE

2,021,905

RAILWAY CROSSING

William H. Whalen, Beverly Hills, Calif., assignor to Silent Railway Crossing Company, Los Angeles, Calif., a corporation of California

Application July 30, 1932, Serial No. 626,722

22 Claims. (Cl. 246—219)

My invention pertains to a type of railroad crossing designated as a continuous rail crossing.

An object of my invention is in a railway crossing to eliminate the open flange grooves which it is now necessary to provide so that the flanges on trains running across the crossing in different directions will have a free passage. This construction causes a jolt or jar when a wheel tread passes the open flange groove.

An object, therefore, of my invention is the construction of a cross-over having rotatable buttons or circular disks, each having a flangeway groove and being provided with a bearing surface for the rolling of the tread of a wheel. These buttons are located at the intersection of the crossing rails and the buttons or disks may be rotated to bring the flange groove and tread section of the button in alignment with the particular track on which the train may be operated.

It is manifest that if a simple cross-over is used, that is, with two tracks, each having a pair of rails, that four buttons or rotating disks are required. Another object and feature, therefore, of my invention, is the construction of an interlinking operating mechanism between all of the disks or buttons whereby these may be rotated simultaneously. If the tracks of the crossing should be at right angles, the buttons must rotate ninety degrees, and if the crossing is at a different angle, the buttons will, necessarily, have to rotate the proper amount to properly align with the rails of the different tracks. The interlinking mechanism is preferably done by employing a master moving device, such as a bell crank, which may be operated by a power mechanism, and this bell crank operates links. The links are connected to cranks on vertical shafts depending from the buttons or disks. Therefore, on rotation of the bell crank and the connecting links, all of the buttons are rotated simultaneously through the same angle.

Another object and feature of my invention is in a locking mechanism for the master bell crank. This, preferably, employs a cam plate with locking notches therein, these notches being positioned so that a pin or the like on the bell crank is brought into the notches at each end of the stroke, these notches, therefore, locking the bell crank and, hence, the links and the buttons in their extreme positions of movement, that is, with the buttons aligned for the two different sets of rails at the cross-over.

Another object and feature of my invention is the manner of constructing the operating mechanism for rotating the buttons by means of power units and the connecting bell cranks and links below the center of the intersecting tracks. With this arrangement I employ a heavy sub-structure which is located on the track ballast. On this substructure I mount the rails of the cross-over with the buttons in suitable castings forming small turn tables. A central removable panel is located between the intersecting tracks. This allows access to the power units, which may be either electrical or hydraulic, to actuate the bell crank, hence, the links, and rotate the buttons.

Another object and feature of my invention relates to the mounting of the buttons. These are in the form of disks, having a thrust bearing mounting on a substantial bearing casting, these castings having a recess so that the top bearing surface of the button will be on the same horizontal level with the tread of the rails and the flange groove may align with tracks having a flange groove as in city street car lines or with the edge of the rail to accommodate the flange on a ball type of rail head. The buttons are provided with a water tight packing to reduce the amount of water which may seep downwardly into the button and the bearing element. This packing is in a groove and provided with a drain outlet. In order to prevent freezing up of the buttons due to frozen water, I provide electrical heating units for each button, these being controlled by a thermostat so that the buttons and their mountings may be heated in cold weather.

Another detailed feature of my invention relates to the construction of the buttons, each with a single vertical shaft, the shaft fitting in sockets or perforations in either crank arms or similar constructions, the attachment being such that any individual button with its shaft may be lifted without disturbing the crank. This allows ready lifting and replacement of any button should the mechanism get out of order. In order that a temporary button with intersecting flange grooves may be utilized in case of derangement of any single button, the rotating button may be removed and the button with the intersecting flange grooves inserted and this is located in a proper position, preferably by means of a fixed bolt or pin engaging in a vertical groove in the temporary button. This bolt or screw has its end fitted in an arcuate groove in the face of a rotatable button.

My invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a plan of a railway crossing partly broken away, showing this arranged for through traffic in one direction.

Fig. 2 is a vertical longitudinal section on the line 2—2 of Fig. 1 in the direction of the arrows.

Fig. 3 is a vertical longitudinal section on the line 3—3 of Fig. 1 in the direction of the arrows.

Fig. 4 is a vertical transverse section on the line 4—4 of Fig. 1 in the direction of the arrows.

Fig. 5 is a plan similar to Fig. 1 with the crossing arranged for traffic in the opposite direction of Fig. 1.

Fig. 6 is an enlarged vertical section through one of the rotatable buttons or disks.

Fig. 7 is a detailed horizontal section on the line 7—7 of Fig. 6 in the direction of the arrows, illustrating an electrical heating unit.

Fig. 8 is a detail of the locking cam plate and associated parts.

Fig. 9 is a perspective view of one of the rotating buttons.

Fig. 10 is a wiring diagram of the heating connections.

Fig. 11 is a perspective view of a dummy button for replacement of a moving button.

The crossing illustrated is suitable particularly for city street railway intersections and shows a single track 11 of standard gauge having rails 12 and 13. This is intersected by a track 14 of standard gauge having rails 15 and 16. In addition, there is a narrow gauge track 17 employing the rail 15 and a rail 18. This forms a type of intersection found in some types of railroad crossings. Such may be considered as an intersection of two standard gauge tracks and a narrow gauge employing one of the rails of one of the standard gauge tracks. While this necessitates a considerably more complicated crossing equipment than the intersection of two either standard narrow gauge or a standard and a narrow gauge line, nevertheless, it illustrates how my invention may be utilized in more or less complicated situations.

The rails 12, 13, 15, 16, and 18 may be of standard types and they connect into a substantial crossing casting 19. This casting has rails 20 and 21 to carry the single track line 11, these being in line with the rails 12 and 13, respectively. The casting also has rails 22 and 23 to carry the standard gauge track 14 having the rails 15 and 16, respectively, in alignment with the rails 22 and 23 of the casting. There is also an inner rail 24 in alignment with the rail 18 which, with the rail 22, carries the narrow gauge line.

Each of the rails of the crossing casting is indicated as having a tread 25, a flange groove 26, a vertical web 27, and a flanged base 28. In order to give room underneath the casting and to give this additional support, I employ a sub-structure 29. This has a substantial I-beam frame 30 made up of a series of individual beams having top flanges 31 on which the flanges 28 rest, an I-web 32, and a base flange 33. The sub structure 29 having the I-beam frame rests on a base plate 34, this being secured to the I-beams. The base plate preferably rests on a deep ballast foundation formed, preferably, of tamped rock.

At the intersection of each of the rails there is a heavy block structure 35 for the intersection of the single rails. Where the two rails 16 and 18 are close together, enlarged blocks 36 are utilized. In the blocks 35 there is formed a cylindrical recess or socket 37 and in the blocks 36 there are two of these recesses or sockets 38 and 39. Each of these sockets has a flat horizontal surface 40. A cylindrical opening 41 extends downwardly from the socket. The substructure is formed with depending hub journal sections 42 having cylindrical openings, these being in alignment with each of the sockets. The I-beams of the substructure have circularly curved sections 43 surrounding the hub journals 42 and at each socket. In order to accommodate the sockets 38 and 39, this curved portion of the I-beam structure is made larger, as indicated at 44. In the I-beam structure at the curved portion 43 there is an internal opening 45 for internal operating mechanism and at the portion 44 there is an internal opening 46 for similar operating mechanism.

In each of the sockets 37, 38, and 39, there is a rotatable button or disk 47. Each of these has a vertical cylindrical shaft 48 which is journaled in the cylindrical journal section 41 of the heavy blocks 35 and 36 and extends downwardly through the hub journals 42. The buttons have a cylindrical section 49 having a working clearance in the cylindrical sockets 37, 38, and 39, all of which are preferably made of the same size. Each button has a flat base 50 to bear on the surface or shoulder 40 of the casting blocks 35 and 36. Each of these buttons has a single flange groove 51 and a tread 52 on both sides of the flange groove for the wheel tires. Each of these buttons is provided with an annular groove 53 in which there is fitted a water-tight packing 54. In addition, to provide a drain for any water which may accumulate above the packing, the drain duct 55 is formed in the blocks carrying the buttons, and a drain pipe 56 leads from these ducts, preferably to the ballast below the subfoundation.

The lower end of each shaft 48 preferably has a squared section 57, each of which fits loosely into a socket 58 in a bottom flange 59 of the I-beam substructure. Each of these I-beam substructures has a supporting abutment 60. Between this abutment and the lower end 61 of the hub 42 there is an open space 62. In this open space there is fitted a crank arm 63. Each crank arm has a hub 64 with a squared opening 65, the squared opening being designed for a loose fitting engagement with the square end 57 of the shaft 48 of each button. Each of these shafts has a similar crank arm. In the construction illustrated a first cross link 66 connects diametrically opposite crank arms of the buttons of the common rail of the standard and narrow gauge tracks and the single rail of the narrow gauge track, and a second cross link 67 connects the other two crank arms of the other two buttons of the same tracks. It will thus be seen that there are two diagonally connected links, these crossing over one another. The links are provided with a threaded adjustment 68 having nuts and lock nuts so that they may be accurately fitted. It will be noted that where the links cross over one another that one must be bowed upwardly or both may be bent up or down slightly.

The operating mechanism to actuate the link 67 employs an operating electro-magnetic device 69. This may be in the form of a solenoid and I use a construction of standard manufacture which has a rotating shaft 70, to which is connected an arm 71. This arm is pivotally connected to a link 72, which link has a pin 73 at its remote end. This link operates a crank arm 74 which is attached to a rock shaft 75, the arm having a slot 76. This rock shaft is journaled at the bottom in a socket 77 in the substructure and at the top in a cam plate 78. Connected to this rock shaft there is a second arm 79 which

operates a short link 80, which link is pivotally connected at 81 to a bracket connected to the link 66. A second crank arm 82 is also connected to the rock shaft 75 and connects to a second link 83, which is pivotally connected at 84 to the other cross link 67.

A locking arrangement utilizes the cam plate 78 which has a cam slot 85 therein. This slot has a straight section 86 and two end locking sections 87 and 88. When the solenoid is energized in one direction, it swings the arm 71, for instance, into the position shown in Fig. 1, in which the pin 73 fits in the locking end 88 of the cam groove 85. This holds and locks the buttons in such a position that the flange groove 51 is in alignment with the tracks 15, 22, and 18 and 24 of the narrow gauge track, thus giving a continuous crossing without any open flange section. Therefore, trains may run over this crossing on the narrow gauge track without any bump or jolt at the open flange guide groove. This, therefore, gives a continuous rail crossing and a silent action of the trains at such crossing. When the solenoid or power element 69 is energized in the opposite direction, the pin 73 is forced to the opposite end of the cam groove and enters and locks in the section 87. This action causes a movement of the links 66 and 67 and rotates the buttons to bring the flanged guide groove in alignment with the track 11 having the rails 12 and 20, and 13 and 21. This gives a continuous crossing, therefore, for the standard gauge track crosswise to the narrow gauge track. This action of rotating the buttons in the tracks 18 and 24 is by means of operating arms 89 and 90 which are connected respectively to the links 66 and 67, and these rotate this pair of buttons on the movement of the links 66 and 67.

In order to simultaneously move the buttons in the tracks 16 and 23, the arms 89 and 90 each have a common hub 91. There is one operating arm 92 connected to one and 93 connected to the other hub. The arm 92 is illustrated as having a link 94 connected thereto and the arm 93 a link 95. The link 94 connects to an operative arm 96 and the link 95 to another operative arm 97. Each of these arms has a hub 98 and a squared socket engaging the squared end of the outer set of buttons which are in alignment with the rails 16 and 23, and 12 and 13. Therefore, the actuating mechanism rotates all of the six buttons simultaneously for forming a continuous and silent crossing for the standard gauge track 11 in one direction, the standard gauge track 14 at an angle thereto, and a narrow gauge track 17 which employs the common rails 16 and 22, and the rails 18 and 24. If only two standard tracks or a standard and a narrow gauge track have a crossing with no common rail, the construction is simplified, in which there would be only four buttons and the long links 66 and 67 would connect to these four buttons through the intermediary of the short cranks of the operating shaft of the buttons.

In order to obtain even stresses and as straight a thrust and pull as possible in the various operating levers, arms, and links, the arm 71 is illustrated as being curved slightly downwardly from the top of the rotating shaft 70. This is connected between ears on the link 72, which link has a split end 99 which fits on the upper and lower sides of the main crank arm 74. The pin 73, which forms the pivotal connection between this link 72 and the arm 74, as above mentioned, extends upwardly through the slot 76 and has a roller 100 operating in the cam slot. As above mentioned, the main crank arm 74 operates on the rock shaft 75 but it is not necessary that the shaft actually rock as I find it preferable to form the crank arm 74 with an elongated hub 101 (note Fig. 3), this hub extending from the socket 77 to the cam plate 78. Therefore, the secondary cranks 79 and 82 may be connected directly to the hub 101. This gives a substantial structure. Of course, if desired, the pin 75 and the hub 101 may be formed integral, but by making the pins separate it is, possibly, easier for assembling.

In order that a distance signal may be given to show the position of the crossing, that is, the direction in which the buttons are turned for through traffic, I provide a signal control box 102. This may be of a standard construction and has an operating arm 103 pivotally mounted in the box and connected by a link 104 to a downward extension of the pivot pin 105, which connects the arm 71 and the link 72. Therefore, in the operation of the power unit 69, which is preferably a standard type of solenoid mechanism, to turn the buttons, the signal control arm 103 operates and the signal control mechanism in the box 102 is actuated. Distance signals may thereby be given along the track to indicate to approaching cars or trains the positions of the cross-over buttons. This forms no immediate part of my invention and is not illustrated herein.

A heavy cover plate 106 is provided to house and form a cover for the power unit 69 and the various links and levers operated thereby. The inside rails of the casting forming the crossing are provided with horizontal shoulders 107, on which there is a packing gasket 108. There is a slight clearance space 109 left between the inner rim 110 of these rails and the edge of the cover, which may be filled with an expansible packing, such as hemp or the like, and thus maintain a water-tight cover. The cover is secured in position by bolts or the like.

A small removable cover 111 is fitted between the rails 23 and 24 of the crossing casting. This has a water-tight joint and is for the purpose of enclosing the whole of the interior of the casting with a water-tight cover.

I have made provision for removing any one of the rotatable buttons or disks should such a button stick and refuse to rotate for any reason or should it be desired to make alterations or repairs. Each of the rotatable buttons is provided with a notch 112 on the sides. The axis of said notches is on a diameter to the flange groove. Therefore, for removal of the button such buttom may be turned to align the notches 112 with the flange grooves in the rail sections of the crossing casting and the approaching rails. Then hooks or the like may be fitted in these notches, the hooks being accommodated in the adjacent flange groove, and the button may be lifted from its seat. The button is not attached to the hub of the cranks which are used to turn the button, and, therefore, there is nothing to obstruct the lifting of the button.

The replacement or dummy button illustrated in Fig. 10 is designated by the numeral 113. This does not need a shaft or stem. It has two intersecting flange grooves 114 and 115 and in order to properly center the dummy or non-rotatable button, this button is provided with a rotation stop slot 116 extending upwardly from its lower surface. This groove is engaged by a threaded pin or bolt 117 which extends inwardly through the block section of the cross-

ing casting adjacent the socket of each button. This is properly positioned so that the buttons with the intersecting flange groove will properly align with the flange grooves of the approaching rails. In order that these dummy plugs may be inserted and removed, they are provided with threaded sockets 118 in which screw eyes may be threaded for use in lifting the buttons. In order that the bolts 117 need not be removed from the crossing casting, the live or rotatable buttons are provided with a segmental groove 119 extending partly around their periphery, in which the inner end of the bolt fits. A vertical slot 120 extends upwardly in the face of each of the live buttons to allow dropping of these buttons in place, the end of the bolt fitting in the vertical groove 120 and then entering the peripheral groove 119.

In order to prevent freezing of the buttons in cold weather should any water seep downwardly between the buttons and the socket in which they rotate, I provide an annular groove 121 in the casting adjacent the lower corner of each of the sockets carrying the buttons. In this groove there are located electrical heating units 122. The lead wires 123 extend outwardly through openings in the casting. The heating circuit is illustrated in diagram in Fig. 10, in which lines 124 indicate the power supply connections, 123 are the connections to each heating unit, 122 are the heating units themselves at each button, and the control of the current is by means of a thermostat 125. This may be of a standard construction and is adjusted to close the circuit when the temperature reaches freezing point and to increase the amount of current as the temperature falls. This thermostat is preferably housed underneath the cover 106 but may be located in any suitable place in order to be responsive to the external temperatures.

In the specification I have not described the mechanical construction of the actuating power device 69 which is in the type of an electric motor, as this is a standard equipment unit which may be purchased and installed. Also, I have not described how this power unit is energized and de-energized for rotating the buttons or small turn tables. This control may be of any suitable type now known for operating switches and signals in railroad construction. The power control might be manually operated as by a tower man on the railroad, but I contemplate making the control automatic either through the medium of the approaching trains or cars or by a power control by the engineer or motorman of the trains or cars. I have not described the mechanical construction or manner of operation of the signal control box 102. This is, in reality, a switch box for giving signals of a standard character which may be purchased and installed. This is intended to give a distant signal along the railway tracks to indicate the position of the buttons in the intersections. For this purpose substantially standard railway signalling equipment may be utilized.

Various changes may be made in the details of construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In a railway construction, a railway crossing having at least four intersecting rails and track rails in alignment therewith forming intersections, a rotatable button at each intersection, each button having a bearing surface continuous with the bearing surface of the rails for passing the treads of wheels, and having means for passing the flanges of the wheels, a power device, a main bell crank having a pin, a connection from the power device to such pin, a cam to guide the pin, such cam having a locking device at opposite ends of movement of one of the arms of the bell crank, and a connection from the other arms of the bell crank to each of the buttons to rotate all of the buttons simultaneously in the same direction through the same angular turn.

2. In a railway construction as claimed in claim 1 the cam having a plate with a slot therein, with the pin on the bell crank fitting in the slot, said slot having two locking end sections to lock the bell crank at opposite ends of its movement.

3. In a railway construction, a railway crossing having at least four rails and connected to rails of a track to form intersections of the rails, a rotatable button at each intersection, each button having a bearing surface to form with the bearing surfaces of the rails a continuous support for the treads of wheels, a power device, a main bell crank having a pin, the pin being operatively connected to the power device, a cam plate having a straight slot with two locking ends, the pin fitting in and being guided in said slot, and a mechanism connected to the bell crank and to each of the buttons to rotate all of the buttons simultaneously in the same direction through the same angular turn, the locking ends of the cam slot locking the bell crank at each end of its stroke.

4. In a railway construction as claimed in claim 3, the mechanism connecting the bell crank and the buttons comprising a crank on each button, a link connecting the cranks of diametrically opposite buttons, and an operating connection from the bell crank to each of said links.

5. In a railway construction, a railway crossing having at least four rails and connected to rails of at least a pair of tracks to form intersections of the rails, a rotatable button at each intersection, each button having a bearing surface to form with the bearing surfaces of the rails a continuous support for the treads of wheels, a power device, a crank mounted on a rock shaft, a reciprocating link connected to the power device and to the crank, the connection of the crank and the link having a pin operating in a slot, a cam plate having a cam slot, one part of which is straight and the two ends being opposite forming locking ends, said pin operating in the cam slot, and a connection from the rock shaft to each of the buttons to rotate said buttons to align the bearing surface of the buttons with that of either set of rails to provide a crossing for trains.

6. In a railway construction, a railway crossing having at least two intersecting rails, and a rail of at least two tracks in alignment therewith to form an intersection, a rotatable button mounted in such intersection, said button having a bearing surface to form with the bearing surfaces of the rails a continuous support for car wheels operating along either of the sets of rails, a rock shaft having a crank arm connected thereto, said crank arm having a slot, a reciprocating link having a pin operating in said slot, a cam plate having a cam slot, the pin extending through the cam slot, said cam slot having a straight portion and two opposite end locking portions, the locking portions being substantially radial with the rock shaft as a center, and the straight portion being at right angles to said crank arm when the arm is intermediate the end locking portions,

a power unit to reciprocate said link, and an operating connection between the rock shaft and the button to rotate the button to align its bearing surface with the different intersecting rails.

7. In a railway crossing construction, a locking mechanism having a crank arm pivotally mounted on a rock shaft, said crank arm having a longitudinal slot, a reciprocating link having a pin operating in said slot, a cam plate having a cam slot with said pin extending therein, said slot having a straight portion and two end locking portions, the end locking portions being radial with the rock shaft as a center, and the straight portion being positioned at lesser radius than that of the locking portions, said link reciprocating substantially in alignment with the straight section of the cam slot.

8. In a railway construction, a railway crossing having intersecting rails and track rails, a rotatable button at the intersection, said button having a bearing surface continuous with the bearing surface of the rails for passing the treads of wheels and having means for passing the flanges of wheels, a power device, a main crank having a pin, a connection from the power device to said pin, a cam to guide the pin, said cam having locking devices at opposite ends of movement of the crank, and a connection from said crank to rotate said button.

9. In a railway construction as claimed in claim 8, said power device and pin having a link connection, the cam having means to guide the pin in a rectilinear motion, and means to shift the pin to engage said locking devices.

10. In a railway construction, a railway crossing having intersecting rails and track rails in alignment forming the intersection, a rotatable button at the intersection, said button having a bearing surface continuous with the bearing surface of the rails for passing the treads of wheels, a main crank having a slot, a pin fitted in said slot, a cam plate having a second slot forming a cam, the pin being guided in the two slots, the slot and the plate having offset locking sections, a power means connected to the pin, said pin being guided in the slot of the plate and the slot of the crank to engage opposite ends of a stroke in the offset portions of the slot of the plate, and an operating means connected to the crank to rotate said button.

11. In a railway construction, a railway crossing having intersecting rails and track rails in alignment forming an intersection, a rotatable button at the intersection, said button having a bearing surface continuous with the bearing surface of the rails for passing the treads of wheels, a link, a connection from the link to a power device, a main crank having a slot, a plate having a second straight slot with offset ends forming a cam, the pin being connected to the link and fitted in the slot of the crank and the slot of the plate whereby the crank becomes locked at opposite ends of its stroke, and means connected to the main crank to rotate the button.

12. In a railway construction, a pair of intersecting rails having a socket at the intersection, a button rotatably mounted in the socket having a groove for passages of the flange of a wheel and wearing surfaces for the tread of the wheel, the button having a cylindrical side wall with a segmental groove and a vertical groove, the intersection having a securing pin extending into said grooves whereby the button may be rotated the length of the segmental groove, said socket having a base with the button resting thereon, there being a cylindrical bearing below the base, said button having a vertical shaft extending therethrough, with means on the lower end of the shaft to rotate the button.

13. In a railway construction as claimed in claim 12, a substitute button having a flat base, a cylindrical side wall with a vertical slot, the top of the button having a pair of intersecting grooves to carry the flanges of wheels, the vertical slot engaging said pin in the intersection.

14. In a railway construction as claimed in claim 12, the button having a notch on opposite sides for removal of the button from the intersection, said notches being positioned to align with a flange groove in a rail.

15. In a railway construction, a pair of intersecting rails each having a flange groove and a solid intersection with a socket therein, a rotatable button having a bearing in the base of the socket and having a flange groove to align with the flange grooves of the rail, a packing on the side face of the button engaging the socket, and a drain duct extending from the flange groove of one of the rails through said rail.

16. In a railway construction, a railway crossing having intersecting rails and track rails, a rotatable button at the intersection the said button having a bearing surface continuous with the bearing surface of the rails for passing the treads of wheels and having means for passing the flanges of wheels, a main pivoted crank having a slot, a cam guide having a slot with offset locking ends, a slidable pin engaged in said slots and means operative by pressure on the pin to move the pin out of one locking offset end, the length of the cam slot and into the other locking end, and means connected to the said main crank to rotate the button.

17. In a railway construction as claimed in claim 16, the slot of the crank being radial as regards its pivot, the offset locking slots being radial to the pivot of the crank, the cam slot forming substantially a cord between the two offset locking ends.

18. In a railway construction, a railway crossing having intersecting rails and track rails, a rotatable button at the intersection, said button having a bearing surface continuous with the bearing surface of the rails for passing the treads of wheels and having means for passing the flanges of wheels, a rigid cam plate, a main crank pivoted to said plate, there being a slot in the crank radial as regards the pivot of the crank, the cam plate having a guide cam slot with offset locking ends, the locking ends being radial as regards the pivot of the crank, a movable pin extending through said slots, and means to move said pin through the guide part of the slot in the cam plate between the two locking offset ends and means operated by the main crank to rotate the button.

19. In a railway construction, a pair of intersecting rails having a socket at the intersection, and each having a wear surface and means for passing the flange of a wheel, a button rotatably mounted in the socket having a wear surface for the tread of a wheel and means to pass the flange of a wheel, the button having a cylindrical side wall with a segmental groove and a vertical groove, the intersection having a securing pin extending into said grooves, and passing through the vertical groove when assembling the button in a socket, the segmental groove forming a limit with the pin to the rotation of movement of the button.

20. In a railway construction as claimed in claim 19, the cylindrical side having diametrically opposite notches, said notches always being in alignment with a flange passing part of one of the rails when its rear portion is in alignment with the other rail, said notches being adapted to permit removal of the button.

21. In a railway construction as claimed in claim 19, the button having notches alignable with the means for passing the flange of a wheel and one of the rails to permit removal of the button, and a substitute button having two intersecting grooves for passing wheel flanges and with wear surfaces for the treads of the wheels, said substitute button having a cylindrical side with a vertical slot to engage the said pin, the pin being positioned at the intersection to align the wear surfaces of the substitute button with the wear surfaces of the rails.

22. In a railway crossing, a socket at each intersection forming four sockets, a rotatable button mounted in each socket and having a wear surface for aligning with the wear surfaces of the rails for passing the tread of wheels and having means for passing the flanges of wheels, each button having an arm connected thereto, two diagonal links each connected to the arms of diagonally opposite buttons, a main pivoted crank, means to oscillate said main crank, the main crank having secondary arms and secondary links between each of the secondary arms and the main diagonal links to simultaneously rotate the buttons on each oscillation of the main crank, a cam associated with the main crank, a pin slidably mounted on said main crank in a radial direction, the cam having a locking means at each end for the pin and a power means to move the pin lengthwise of the cam between the two locking means and radial as to the crank.

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