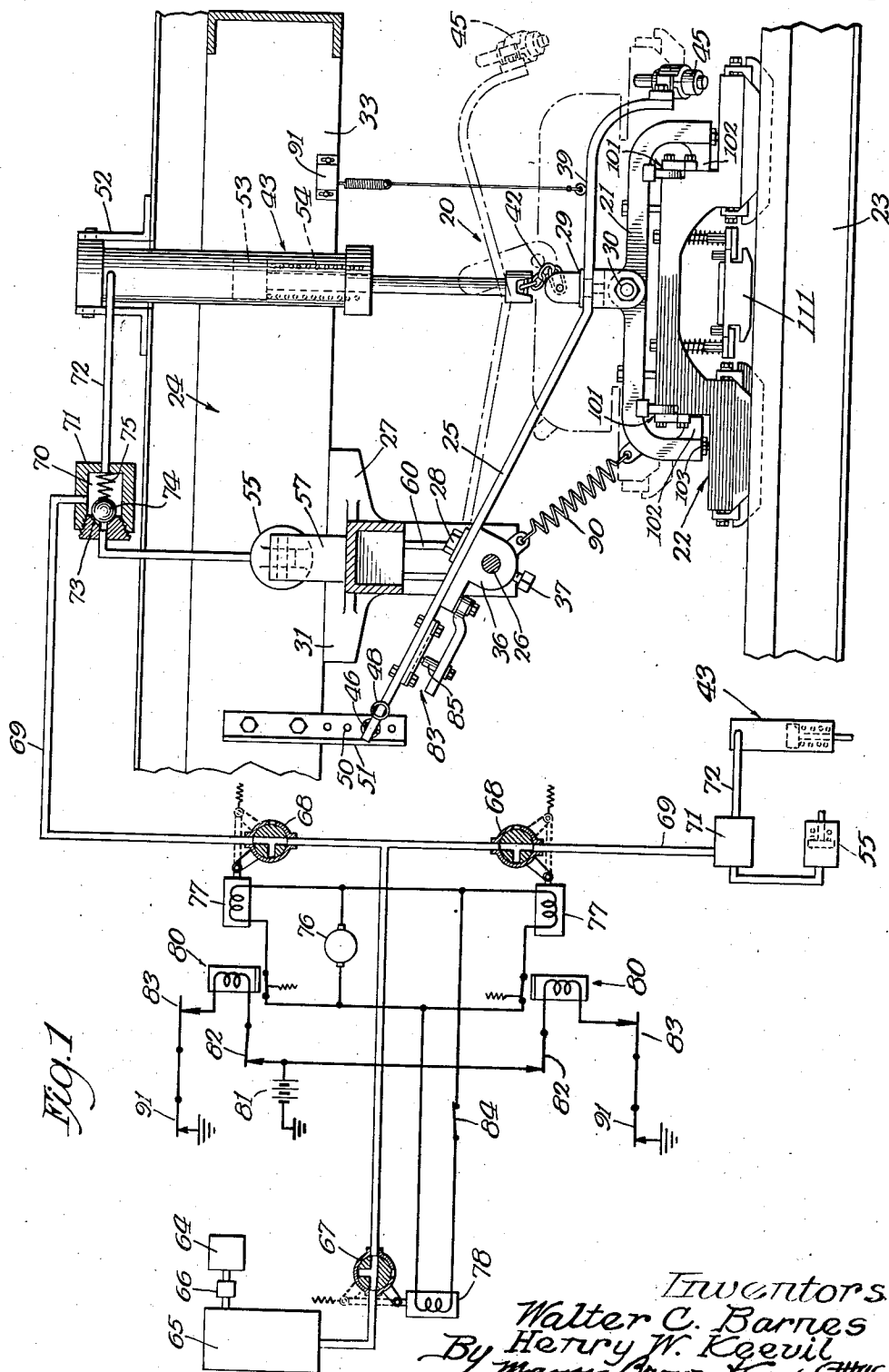


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4. Sheets-Sheet 1



July 29, 1941.

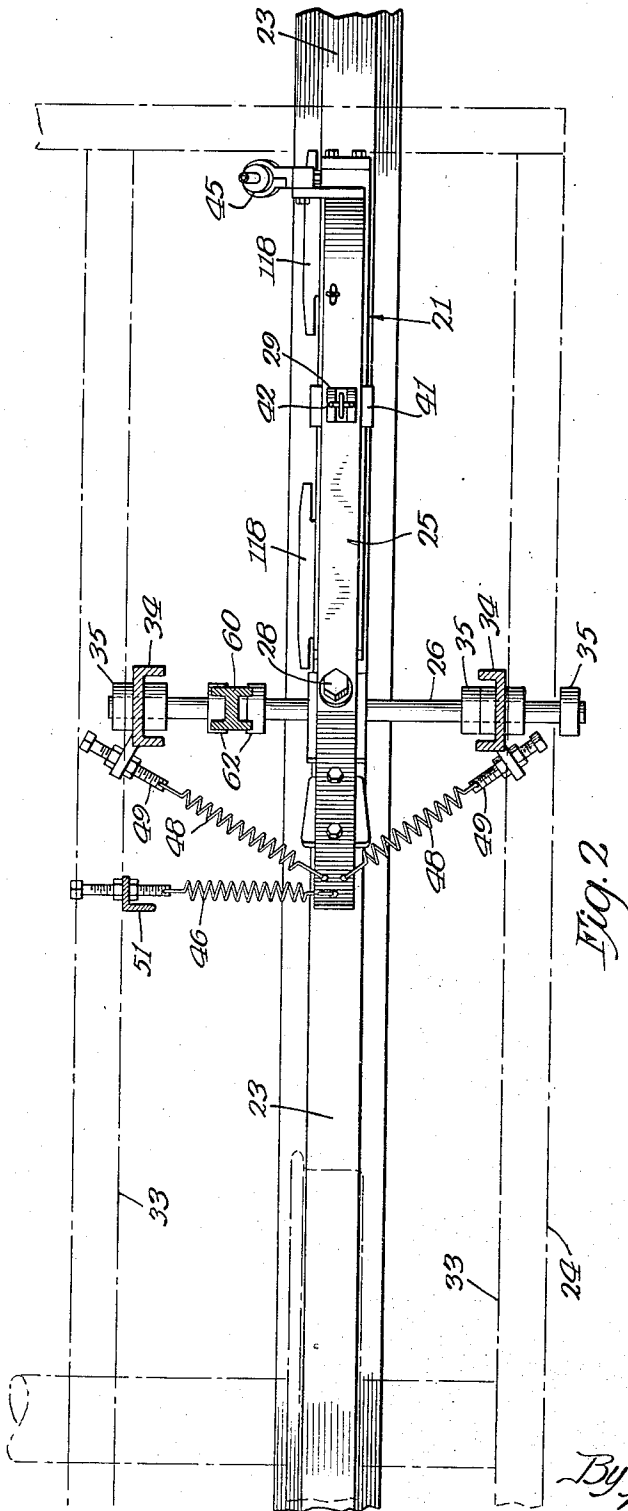
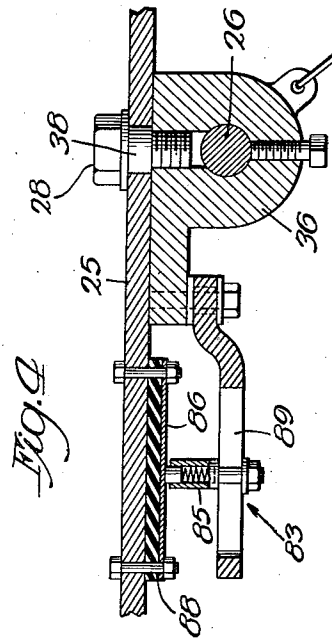
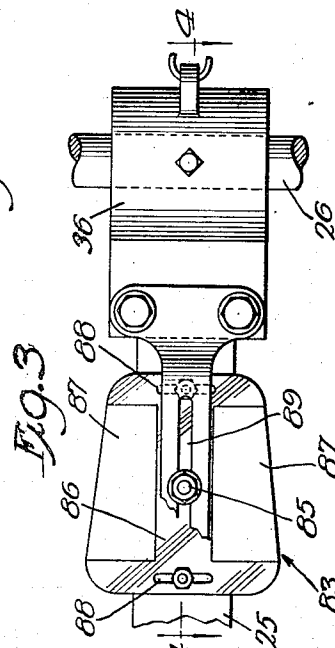
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DETECTOR CARRIAGE

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4 Sheets-Sheet 2



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DETECTOR CARRIAGE

Filed June 6, 1938

4 Sheets-Sheet 3

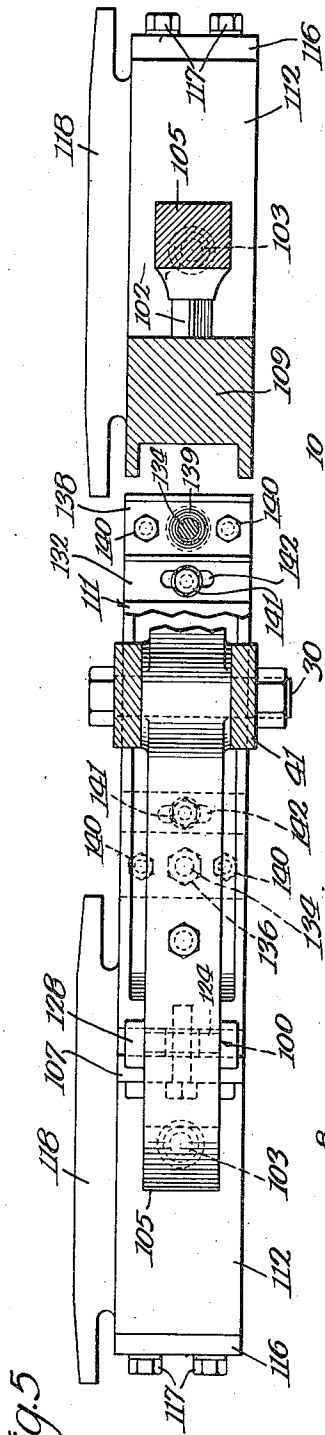


Fig. 5

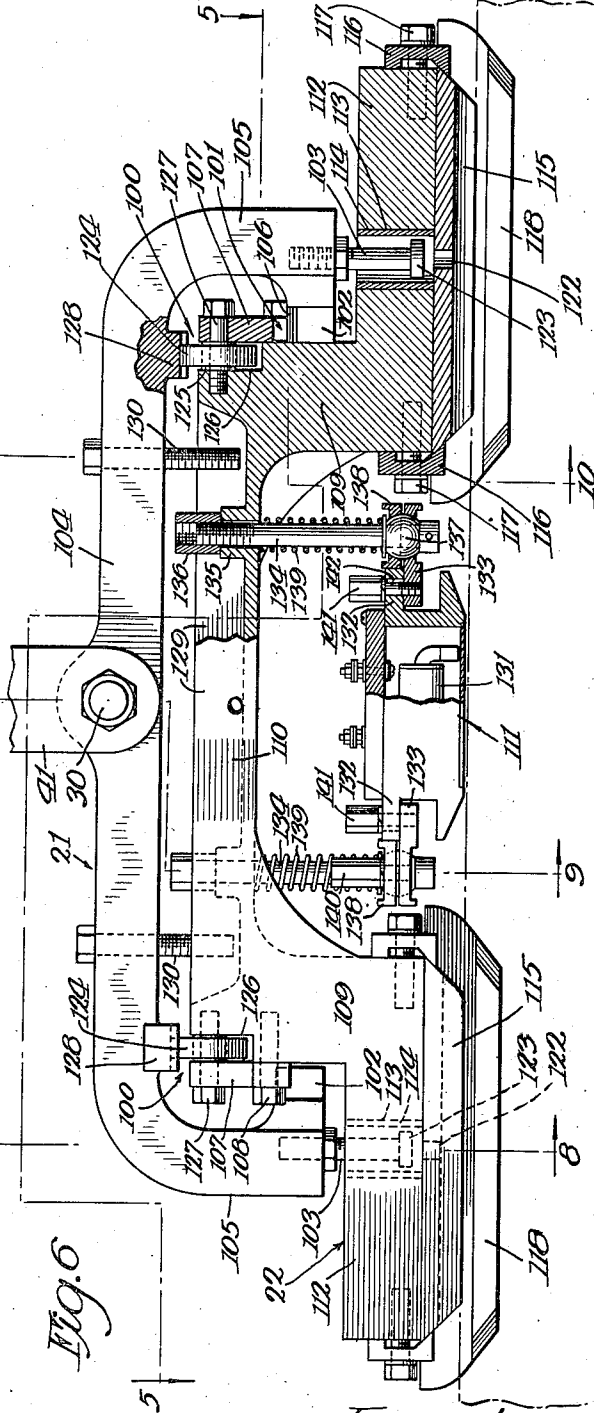


Fig. 6

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UNITED STATES PATENT OFFICE

2,250,460

DETECTOR CARRIAGE

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Application June 6, 1938, Serial No. 212,122

19 Claims. (Cl. 175-183)

This invention relates to an improved detector carriage for use with rail flaw detecting apparatus; the principal objects of the invention being to provide a carriage which will more effectively follow the varying contours of rail than like carriages now known and used, and which is provided with means for facilitating the adjustment of the position of the pickup box with respect to the rail.

Further and other objects and advantages will become apparent as the disclosure proceeds and the description is read in conjunction with the accompanying drawings, in which—

Fig. 1 is a side elevational view showing the improved carriage mounted on the rear end of a detector car, a diagram being associated with the view showing the control means for raising and lowering the carriage;

Fig. 2 is a plan view of the improved carriage;

Fig. 3 is a fragmentary bottom plan view showing the manner in which the safety switch is mounted on the supporting arm;

Fig. 4 is a sectional view taken on the line 4-4 of Fig. 3;

Fig. 5 is a plan view looking down on the carriage, with the upper portion of the carriage at the right of the figure broken away along the line 5-5 of Fig. 6;

Fig. 6 is a side elevational view of the carriage, with parts broken away to better illustrate the construction;

Fig. 7 is an end elevational view of the entire carriage mounting and assembly, the point of view being from the left in Fig. 1;

Figs. 8, 9 and 10 are vertical sectional views through the carriage, taken on the lines 8-8, 9-9 and 10-10, respectively, of Fig. 6.

General organization

The detector carriage of this invention, generally designated 20, comprises an upper carriage 21, and a lower carriage 22, the latter being adapted to ride upon the rail 23 when the carriage is lowered without restraint from the upper carriage except for a lateral force transmitted to it by the upper carriage to hold it against the gauge edge of the rail, a slight downward force to hold it steady on the rail, and a longitudinal thrust for moving the lower carriage along the rail.

The upper carriage 21 is supported from the underframe 24 of the detector car by means of an arm 25, preferably of non-magnetic material, pivotally mounted on a shaft 26, trunnioned on a

supporting bracket 27 fixed to the car underframe. The arm 25 is also pivoted about a vertical pin 28, so that the carriage can swing laterally with respect to the car body. The upper carriage 21 is secured to the lower end of the arm 25 by a vertical pin 29 and a horizontal pin 30, which permit the carriage as a whole to have longitudinal rocking and lateral swinging movement with respect to the arm.

Supporting mechanism for the detector carriage

The entire supporting mechanism for the detector carriage is carried by the bracket 27, so that it can be easily and quickly installed on the car and removed when replacement or repairs are necessary. The bracket 27 is a relatively large casting having attaching flanges 31, through which bolts 32 pass for securing the bracket to the spaced side sills 33 at the side of the car. The bracket has downwardly extending arms 34, through which the shaft 26 extends, supported by suitable bearings, and adjustably positioned stop collars 35, on opposite sides of the arms 34, permit the shaft 26 to have limited sliding movement with respect to the bracket.

The arm 25 is mounted on the shaft 26 by means of a pivot block 36, which is clamped in the desired lateral position with respect to the shaft 26 and the rail beneath by a set-screw 37. The pivot bolt 28, which allows the arm 25 to have swinging movement in a more or less horizontal plane, screws into the block in a manner which is best shown in Fig. 4, with an enlarged shank 38 providing a bearing surface for the swinging movement.

The lower end of the arm 25 has a horizontal portion 39 through which the vertical pivot pin 29 extends, as best shown in Fig. 9, and this pin also has an enlarged shank, as indicated at 40, to provide the desired bearing surface for allowing the detector carriage as a whole to swing in a horizontal plane about the pin. The pin 29 has its lower end screwed into a clevis 41, through the jaw arms of which the horizontal pin or bolt 30 extends. The head of the pin 29 is bifurcated to receive a lift chain 42, associated with a lift cylinder, generally designated 43, and a pin 44 holds the chain in place.

The extreme rear end of the arm 25 supports a paint gun, generally designated 45, which is preferably mounted on the arm by a universal support which permits the angular position of the gun to be properly adjusted.

The upper end of the arm 25 (see Fig. 7) is re-

silently connected to a fixed part of the car underframe lying inside of the plan projection of the track, by a spring 46, the connection being made by an adjustable screw 47 so that the tension of the spring 46 can be controlled. When the detector carriage is in operative position on the rail, the spring 46 is under tension, thereby applying a lateral force on the detector carriage to hold it in engagement with the gauge edge of the rail. When the carriage is raised from the rail, the spring is under light or no tension, since the entire carriage assembly is positioned inside of the gauge edge of the rail when in raised position, as will hereinafter appear.

The upper end of the arm 25 is also connected to the arms 34 of the bracket 27 by centering springs 48, the tension of which can be adjusted by means of adjusting screws 49. These screws are so placed and adjusted that when the carriage is in its raised position (as shown in dotted lines in Fig. 1), the springs 48 are under equal tension, with the result that they tend to align the arm 25 with the rail; but when the carriage is in operative position on the rail, the inside spring 48 is placed under greater tension due to the lateral shifting of the shaft 26, and the spring, therefore, acts with spring 46 in holding the carriage against the gauge edge of the rail.

The adjusting screw 47, to which the outer end of the spring 46 is attached, may be placed in any one of a number of openings 50 in the vertical angle 51 attached to the car underframe, so that the spring, in addition to exerting a lateral force on the arm (which causes it to swing about the pivot bolt 28) may also exert a varying vertical force, particularly a downwardly directed one on the carriage 20. Under ordinary circumstances, however, the weight of the arm itself, together with the weight of the upper and lower carriages, is sufficient to cause the detector carriage to ride properly upon the rail.

Lift mechanism and associated controls

In general it can be said that springs are used for holding the detector carriage 20 in raised position when the car is running light, or passing over switches, frogs, and the like, and air pressure is used for lowering the carriage to testing position. Two air cylinders control the movement of the carriage, one of which is vertically positioned and serves to raise and lower the carriage, while the other is horizontally positioned and serves to control the lateral position of the carriage. The former, indicated by the reference character 43, is directly over the carriage and is supported at its upper end by trunnions on a bracket 52, attached to the car underframe. The piston 53 is normally held in raised position by a spring 54, but when air is admitted to the cylinder the piston is lowered to the position in which it is shown in Fig. 1, thereby allowing the carriage to move vertically into contact with the rail 23.

The carriage assembly, when in raised position, lies a slight distance inside of the gauge edge of the rail, and when the piston 53 is lowered by the introduction of air into the cylinder 43 the carriage moves in a vertical line until it strikes the rail (see the dotted lines in Fig. 7).

After the carriage has been seated on the rail the entire carriage assembly is shifted laterally by the action of the transverse cylinder, generally designated 55, which is pivotally mounted at one end by a pin 56 on an upstanding boss 57 on the supporting bracket 27, and has its piston 58 con-

nected by a push rod 59 to a vertical lever 60, fulcrumed at 61 on the supporting bracket 27, and having its lower end bifurcated to straddle the shaft 26 between closely spaced shaft collars 62. A spring 63 in the cylinder 55 normally holds the shaft 26 to the left (Fig. 7) as far as permitted by the stop collars 35, but when air is introduced into the cylinder 55 the piston 58 moves toward the center of the car and rocks the lever 60 to shift the shaft 26 to the right. This movement not only moves the entire carriage assembly toward the gauge edge of the rail, as shown in Fig. 7, but it also tensions the spring 46, so that it also exerts a lateral pressure to maintain the detector carriage in constant engagement with the gauge edge of the rail.

The air cylinders 43 and 55 are controlled by an electro-pneumatic system which is shown diagrammatically in Fig. 1. The system includes a compressor 64, connected to an air reservoir 65, through a check valve 66. A solenoid-operated master valve 67 controls the passage of air under pressure from the reservoir 65 to a solenoid-operated, detector carriage, valve 68, of which there is one for each of the carriages on opposite sides of the car. Whenever the valves 67 and 68 are positioned so that air from the reservoir is admitted to the pipe 69, the air immediately passes through the chamber 70 of the time delay device 71 and pipe 72 to the vertical cylinder 43 to lower the detector carriage.

While this is taking place air slowly passes through a small groove 73 provided in the seat for the ball check valve 74 of the time delay device 71, and after a predetermined time interval has elapsed (for example, three seconds) sufficient air pressure is built up in the horizontal cylinder 55 to move the piston 58 and cause the carriage assembly to be shifted into engagement with the gauge edge of the rail. The size of the groove 73 is such that the carriage is always lowered into contact with the rail before the transverse cylinder 55 operates, and in this way the carriage will always be properly seated on the rail, even though the car is standing on a curve when the carriage is lowered.

When the valve 68 is turned to a position such that the air in the pipe 69 is in communication with atmosphere, the air in the cylinders 43 and 55 is immediately exhausted from the cylinders, the ball valve 74 in the time delay device 71 moving back against the spring 75 to permit a quick release of the push-over cylinder 55.

The electrical circuit for controlling the pneumatic system consists of a generator 76, or other source of electro-motive force, connected across the solenoids 77 of the valves 68, and the solenoids 78 of the valve 67. Included in series with each solenoid 77 are the switch contacts of a time delay electrical relay, generally designated 80, the coil of which is energized from a battery 81 whenever the series switches 82 and 83 are both closed. The switch 82 is a manually controlled switch, while the switch 83 is an automatic switch carried on the arm 25 of the detector carriage assembly, and automatically opened whenever the arm 25 swings about the pivot 28 by an angular amount greater than normally results from the car rounding curves.

Assuming that the master switch 84 has been closed, and that the detector carriage shown in Fig. 1 is to be lowered to the rail, the switch 82 is actuated to close the circuit through the coil 80, which, after a predetermined time interval has elapsed corresponding to the setting of the time

delay element in the switch, closes the circuit through the solenoid 77 and thereby causes air to be admitted to the pipe 69 to lower the carriage to the rail. When the switch 82 is opened the time delay relay, which is of the slow make, quick break type, immediately permits the relay contacts to drop away, thereby turning the valve 68 to the position in which it is shown in Fig. 1 to exhaust air from the pipe 69 to the atmosphere, whereupon the carriage is raised to inoperative position.

As will be seen from Fig. 1, duplicate controls are provided for the detector carriage on the other side of the car, and it is obvious that the two carriages can be operated independently of one another.

The safety switch 83 consists of a contact arm 85, carried by the block 36 and extending rearwardly beneath a contact plate 86, mounted on the under side of the arm 25. The plate 86 is bounded on both sides by a flush insulating plate 87, so that when the arm 25 moves through an arc that is greater than required for normal operation of the carriage, the circuit between the contact 85 and plate 86 is broken. This occurs when the carriage is accidentally derailed by a switch point, frog, or the like. The critical angle for operation of the switch can be adjusted by laterally adjusting the contact plate assembly on the arm 25, for which adjustment pin and slot devices 88 are provided, and by adjusting the position of the contact 85 along the arm which extends rearwardly from the block 36, a slot 89 being provided in this arm for that purpose.

A centering spring 90 extending between the upper carriage 21 and the pivot block 36 steadies the carriage and aligns it with respect to the rail when the carriage is lifted. It also relieves the front shoe 115 of excessive wear when the carriage is lowered.

If the carriage should by chance miss the rail when being lowered, the excess vertical movement opens a switch adjustably mounted on the underframe 24, which functions in the same manner as the safety switch 83 in lifting the carriage and automatically lowering it again.

The detector carriage, per se

The function of the upper carriage 21 is to transmit vertical, lateral and longitudinal forces to the lower carriage so that the latter may properly ride on the rail 23. The downwardly directed forces, which may consist solely in the weight of the arm 25 and the upper carriage 21, or the weight of these parts combined with the action of the spring 46 when secured to the bracket 51 in a manner to set up a downward force, are transmitted to the lower carriage by roller bearings, generally designated 100; the upwardly directed forces, consisting in forces used to raise the lower carriage from the rail, are transmitted through a self-centering lifting device, generally designated 101; the longitudinally directed forces transmitted from the upper carriage to the lower carriage are those which move the carriage along the rail, and these are transmitted through thrust lugs 102; and the laterally directed forces used for keeping the lower carriage in contact with the gauge edge of the rail are transmitted to the lower carriage through lateral pressure lugs, generally designated 103.

The upper carriage 21 comprises a yoke, preferably made of cast iron, having a horizontal portion 104 and downwardly extending legs 105, 75

The legs turn inwardly to form the thrust lugs 102, these lugs having their upper surfaces V-shaped, as indicated at 106, to cooperate with the complementary undercut surfaces of the roller clips 107, which are secured to the end faces of the lower carriage 22 by bolts 108. Obviously when the arm 25 is raised by the lift cylinder 43 the combined thrust and lift lugs 102 engage the clip 107 and raise the lower carriage from the rail, centering it at the same time by the action of the complementary V-shaped surfaces.

The lower carriage 22 is also in the form of a yoke, and is preferably made of cast iron or other suitable material. It comprises legs 109, connected by an intermediate portion 110, from which the pickup unit 111 is adjustably supported. The legs 109 terminate in broad feet 112, each of which is provided with a vertical opening 113, to receive the lateral pressure lugs 103. These openings are lined with hardened steel bushings 114 to resist wear. Manganese steel shoes 115 are removably clamped to the feet by clips 116, held in place by bolts 117. Preferably the shoes 115 are cast integrally with gauge runners 118, as best shown in Figs. 8 and 10, with reliefs formed at 119, 120, over the center of the rail and at the intersection of the gauge edge 121 of the rail with the top surface thereof, respectively, to make the shoes ride with greater stability on the rail.

The combined wear shoe and gauge runner are each provided with an opening 122, so that the pocket 113, which receives the lateral pressure lug 103, cannot become clogged with dirt and debris. The gauge runner is shaped to provide maximum strength, and it is rounded at its ends to enable it to ride over obstacles.

The lateral pressure lugs 103 are threaded into the legs 105 of the upper carriage yoke, and each has an enlarged head 123 having sliding engagement with the liner 114 of the vertical opening 113. The lateral forces transmitted from the arm 25 to the upper carriage 21 are evenly distributed between the lateral pressure lugs 103 at each end of the lower carriage 22 by the free swinging action of the carriage, resulting from its swivel connection through the pin 29 with the arm 25. Obviously there is comparatively little sliding movement between the lugs 103 and the liners 114, since the upper carriage normally rests on the lower carriage through the roller assemblies 100, with the result that the liners receive very little wear.

Each of the roller bearing assemblies 100, which transmits the downwardly directed forces from the upper carriage to the lower carriage, consists of a roller 124 mounted on a spacer bushing 125, which is clamped between the clip 107 and the recessed face 126 of the lower carriage by a bolt 127, threaded into the lower carriage, and acting as a pin to support the bushing 127 upon which the roller 124 rotates.

The upper carriage 21 is provided at each end with an enlargement 128, which is suitably machined to provide a bearing surface for the roller bearing 124, as best shown in Figs. 6 and 8.

In order to prevent the lower carriage from tipping over, due to an excessive lateral force, the intermediate portion 110 of the lower carriage is dished out to provide spaced side walls 129 between which stops 130, projecting downwardly from the upper carriage 21, extend. The stops limit the lateral angle through which the

lower carriage can tilt with respect to the upper carriage.

It is obvious that both forward and rearward driving forces for the lower carriage are applied through the thrust lugs 102.

The pickup box 111, which houses the detector coil 131, is provided with longitudinally extending flanges 132, which seat upon narrow shelves 133, adjustably supported from the intermediate portions 110 of the lower carriage 22 by rods 134, the upper portions of which extend through enlargements 135, and are provided with elongated faceted nuts 136, and the lower ends of which are provided with a rounded enlargement 137 which, with the shelves 133 and clamping plates 138, form a ball and socket joint for supporting the pickup box from the rods. Springs 139 extend between the horizontal portion 110 of the lower carriage yoke and the clamping plates 138 to keep the rods 134 in the lowest position permitted by the nuts 136, and incidentally serve as locking means for the nuts. Preferably the pickup box 111 is made of non-magnetic material.

The pickup box 111 can be tilted laterally with respect to the longitudinal axis of the rail by loosening the elongated nuts 140, which clamp the plates 138 to the shelves 133, and then moving the box about the ball and socket joint until the desired position is reached, after which the nuts 140 are tightened to hold the box in adjusted position. The longitudinal tilting position of the box can be adjusted by obtaining the proper relative adjustment between the effective lengths of the two rods 134, and the lateral position of the box with respect to the rail can be adjusted by loosening nuts 141 which clamp the flanges 132 to the shelves of the pickup box, and then moving the box laterally to the desired position, after which the nuts 141 are again tightened. Transverse slots 142 are provided in the shelves 133 to permit this lateral adjustment to be made.

It has been found in practice that the detector carriage of this invention rides smoothly along the rail with the gauge runners 118 at all times in contact with the gauge edges of the rail. The detector carriage has a freedom of movement which enables it to follow all of the varying contours of the rail surface, and the entire carriage is capable of all adjustments which are necessary to insure proper riding qualities for the carriage and positioning of the pickup box with respect to the rail.

We claim as our invention—

1. In combination with a rail car, a detector carriage adapted to be supported on the car and moved along the rail surface, said carriage comprising an upper carriage suspended from the car, a lower carriage adapted to ride on the rail, and means including roller bearings for transmitting a downward force from the upper carriage to the lower carriage.

2. In combination with a rail car, a detector carriage adapted to be supported on the car and moved along the rail surface, said carriage comprising an upper carriage suspended from the car, a lower carriage adapted to ride on the rail, and means for transmitting a lateral force from the upper carriage to the lower carriage to urge the latter against the gauge side of the rail, said means including a lateral pressure lug carried by the upper carriage for engaging an upstanding surface on the lower carriage.

3. In combination with a rail car, a detector carriage adapted to be supported on the car and moved along the rail surface, said carriage com-

prising an upper carriage suspended from the car, a lower carriage adapted to ride on the rail, and means for transmitting a lateral force from the upper carriage to the lower carriage to urge the latter against the gauge side of the rail, said means including a lateral pressure lug extending into a vertically disposed opening in the lower carriage.

4. In combination with a rail car, a detector carriage adapted to be suspended on the car and moved along the rail surface, said carriage comprising upper and lower carriage portions, the former being in the form of a yoke which straddles the latter with the legs of the yoke extending longitudinally of the carriage, and lateral pressure lugs carried by the yoke legs having sliding engagement with upstanding surfaces on the lower carriage.

5. In combination with a rail car, a detector carriage adapted to be suspended on the car and moved along the rail surface, said carriage comprising an upper carriage and a lower carriage, and means for transmitting a downward and lateral force from the upper carriage to the lower carriage, said means including a roller bearing for transmitting the downward component of the force to the lower carriage and a stop for limiting the lateral angular relationship between the upper and lower carriages.

6. In combination with a rail car, a detector carriage adapted to be suspended on the car and moved along the rail surface, said carriage comprising an upper carriage and a lower carriage, and means proximate the rail for transmitting a lateral force from the upper carriage to the lower carriage, and a stop operative between the upper carriage and the top portion of the lower carriage for limiting the lateral angular relationship between the upper and lower carriages.

7. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage comprising an upper carriage and a lower carriage, means for transmitting a lateral force from the upper carriage to the lower carriage, said means including a stop for limiting the lateral angular relationship between the upper and lower carriages, said stop comprising a vertical lug carried by the upper carriage and extending between spaced side walls on the lower carriage.

8. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage including an integrally formed wear shoe and gauge runner along one side only thereof having reliefs over the center of the rail and at the intersection of the gauge edge of the rail with the top surface of the rail.

9. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage comprising an upper carriage and a lower carriage, and means for transmitting downward, lateral and longitudinal forces from the upper carriage to the lower carriage, said means including a roller bearing on the lower carriage in working contact with the upper carriage, a lug on the upper carriage engaging an upstanding surface on the lower carriage for transmitting longitudinal forces, and a lateral pressure lug carried by said lug and having a sliding bearing contact with an upstanding surface on the lower carriage.

10. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage including

an upper carriage and a lower carriage, and means for transmitting vertical forces between the upper carriage and the lower carriage, said means including a horizontal bearing pin on the lower carriage, a roller mounted on said pin and in bearing contact with the upper carriage under normal operating conditions, and a lifting lug on the upper carriage engaging an undercut surface on the lower carriage when the upper carriage is moved upwardly.

11. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage including a yoke having downwardly extending legs and an intermediate raised portion, and means for adjustably supporting a pickup box from said raised portion, said means including a vertically adjustable rod at each end of the box secured to said intermediate portion of the yoke, a ball and socket joint between the lower ends of said rods and the ends of the pickup box, and means for clamping the ball and socket joint in adjusted position.

12. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage including a yoke having downwardly extending legs and an intermediate raised portion, means for adjustably supporting a pickup box from said raised portion, said means including a vertically adjustable rod at each end of the box secured to said intermediate portion of the yoke, a ball and socket joint between the lower ends of said rods and the ends of the pickup box, means for clamping the ball and socket joint in adjusted position, and means for shifting the pickup box laterally with respect to the rods.

13. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage comprising an upper carriage supported from the car by a vertically pivoted arm, means for applying a yielding lateral force to the upper carriage through said arm, a lower carriage adapted to be raised and lowered from the rail by the upper carriage but which when in operative position on the rail rides along the upper and gauge surfaces of the rail without restraint other than the lateral force transmitted to it by the upper carriage, and a longitudinal force exerted by the upper carriage for moving the lower carriage along the rail, and means for transmitting said lateral and longitudinal forces from the upper carriage to the lower carriage, said means including longitudinally spaced lateral pressure lugs on the upper carriage engaging upstanding surfaces on the lower carriage, a vertical pivotal connection between the upper carriage and the arm, and a thrust lug on the upper carriage engaging an upstanding surface on the lower carriage for moving the lower carriage along the rail.

14. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage including an upper carriage and a lower carriage, and means for transmitting vertical forces between the

upper and lower carriages including a horizontal pin on the lower carriage having one end supported by a clip having an undercut V-shaped surface, a roller mounted on the pin for transmitting downward forces from the upper carriage to the lower carriage, and a lift lug carried by the upper carriage adapted to engage the V-shaped surface of the clip for raising the lower carriage from the rail.

15. In apparatus for detecting flaws in rails, a car, a detector carriage mounted on the car, means for raising and lowering the carriage, automatic means for lifting the carriage whenever the carriage moves downwardly beyond a predetermined point, and means for automatically lowering the carriage after it has again aligned itself with the rail.

16. In combination with a rail car, a detector carriage comprising an upper carriage whose weight is supported from the car, a lower carriage adapted to ride on the rail, roller means between the upper and lower carriages for transmitting a downward force from the upper carriage to the lower carriage to hold the latter downwardly against the rail, a post on one of the carriages, a well upon the other carriage receiving the post, said post and well being so constructed and arranged as to convey a force between the carriages transverse to the rail.

17. In combination with a rail car, a detector carriage suspended from the car at one side thereof comprising upper and lower portions movable laterally with respect to each other, means for limiting relative movement between said portions at vertically spaced points, means for moving the carriage downwardly and outwardly towards the gauge side of the rail, rolling means for transmitting the downward pressure between the portions, and guide means for locating the lower portion with respect to the gauge side of the rail.

18. In combination with a rail car, a carriage adapted to be supported on the car and moved along the rail surface, said carriage including an integrally formed wear shoe and gauge runner along one side only thereof and having a relief at the intersection of the gauge edge of the rail with the top surface of the rail.

19. In combination with a rail car, flaw detector mechanism including a carriage adapted to be supported on the car and moved along the rail surface, said device comprising an upper and a lower carriage, one of said carriages having a substantially horizontal concave face providing a track, a roller on the other of said carriages engaging said track, said track and roller transmitting a vertical force between said carriages, means supporting one carriage with respect to the other and providing lateral movement of one carriage with respect to the other, stop means for limiting said lateral movement including a vertical lug upon one of the carriages extending between spaced side walls on the other of said carriages.

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6

CERTIFICATE OF CORRECTION.

Patent No. 2,250,460.

July 29, 1941.

WALTER C. BARNES, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, second column, lines 67 and 71, claim 9, for the word "lug" read --leg--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of September, A. D. 1941.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.