AUTOMATIC RAIL LOCATOR FOR BRUSHES OF FISSURE DETECTOR CARS

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Fig. 1.

Fig. 2.

Fig. 3.
This invention relates to rail flaw detector cars which carry rail flaw detecting mechanism adapted to be raised and lowered with respect to the car. The problem presents itself, when the car is travelling around a curve, of lowering the detecting mechanism so as to locate the rails properly, because it will be understood that if the contact mechanism, when lowered vertically, is designed to engage the rails when the car is travelling around a curve. This invention has for its object, therefore, the provision of means whereby the detecting mechanism may be lowered to effective position to insure rapid engagement of said mechanism with the rails.

We have disclosed two forms of our invention applicable respectively to cars of relatively short length and cars of relatively long length, since such cars being supported on trucks at their forward and rear ends would ordinarily cause a varying deviation of the detecting mechanism with respect to the rails corresponding to the length of the car.

Further objects and advantages of our invention will become apparent in the following detailed description thereof.

In the accompanying drawings,

Fig. 1 is a side view of a car fitted with a form of Sperry detector mechanism.

Fig. 2 is an enlarged view of a portion of the detector mechanism partly sectioned vertically and disclosing the means for lowering the mechanism to the track.

Fig. 3 is a front view of one form of mechanism for locating the flaw detecting mechanism with respect to the rails.

Fig. 4 is a detail showing the means for maintaining the guide wheels of the detector mechanism normally in elevated and outward positions.

Fig. 5 is a side view of another form of locating mechanism designed to be employed upon cars of relatively great length.

Fig. 6 is a plan view of the Fig. 5 form of the invention.

Referring to Fig. 1 of the drawings, we have shown a car 10 of relatively long wheel base mounted on front and rear trucks 11—13 supporting the rail flaw detector mechanism, indicated generally by the numeral 15. Said mechanism, as is well known and as shown in copending application of Elmer A. Sperry, Serial No. 215900, filed August 27th, 1927, comprises essentially a means within the car for generating electric current for delivery to contact brushes 16, 16 for supplying said current to the rail, a contact brush holder 17 being adapted to be raised to ineffective position and lowered to effective position, said holder being provided with wheels 18 designed to run upon the rail, and a detector carriage 20 supported upon the brush holder 17. As shown in Fig. 4 the entire mechanism is intended to be held normally in elevated or ineffective position by means such as spring 21 and cables 22, so positioned that the holder 17 is normally biased toward 70 elevated position and the wheels biased to swing upwardly and outwardly away from the rails. When it is desired to lower the detecting mechanism to effective position that is, into engagement with the rail, fluid 75 pressure operated means, such as the cylinder 25 in which operates a piston 26, said piston being connected through a piston rod 27 to the contact brush holder, is supplied with fluid under pressure to drive the piston down 80 upwardly and hence lower the contact brush holder and hold the same firmly against the rails during operation.

If the car travelled always on straight track only, the flaw detecting mechanism could be lowered vertically into direct contact with the rails. However, there is usually a relatively small proportion of straight track and the device must be capable of operating on curved track as well. As pointed out hereinbefore in travelling around the curve, the wheels 18 of the detector carriage at either side of the car would fall inside and outside of the rails respectively, and on a curve of sufficient degree of curvature the flange 30 of the inside wheel might land directly on the rail or even outside the rail and prevent lowering of the carriage into its proper effective position where it may run along the rails.
We, therefore, provide the following mechanism whereby we insure that the flanges 30 of the inside wheels will always fall between the tracks so that they may be moved outwardly into engagement with the rails. It will be understood that the mechanism shown in Figs. 1 and 2 represents the flaw detecting means at one side of the car adapted to engage one rail and that this mechanism is duplicated on the other side of the car in exact alignment with the mechanism on the first side and is adapted to engage the other rail. The following description will describe the locating means for the flaw detecting mechanism at only one side of the car, and it is understood that this mechanism is duplicated but positioned to act oppositely with respect to the flow detecting mechanism on the other side of the car. In the Figs. 3 and 3 form of the invention, the two flaw detecting mechanisms at the two sides of the car are independent of each other, while in the Figs. 1, 5 and 6 form they are interconnected.

Referring first to the form of the invention disclosed in Figs. 2 and 3, it will be seen that the entire mechanism, including the wheels 18, contact brush holder 17, the detector sled 20 which it supports, and the air cylinder 25 with its connecting rod 27, are mounted for universal movement by cylinder 25 being journaled in ring 28 by trunnions 29 (see Fig. 6); said ring being journaled by trunnions 34 in bearings 35 at right angles to bearings 29, and fixed to the underside of the car by suitable means such as brackets 36. It will be understood that the cylinder 25 at each end of the detecting mechanism is so journaled that the entire detecting mechanism may be swung laterally with respect to the car and the rails about the said pivots 34. Since the springs 21 normally bias wheels 18 outwardly with respect to the rails, it is necessary in lowering, in order to insure that flange 30 will not fall directly on the rail head or outside of the rail, especially when going around curves, that the said wheels be moved inwardly during the lowering operation until the peripheries 37 of the wheels touch the rails and then said wheels may be moved outwardly until flange 30 engage the rail heads. This action consists broadly, therefore, in swinging the detector mechanisms at each side of the car inwardly as they are lowered, until the wheels engage the rail heads and then in the final lowering operation spreading the detecting mechanisms until the flanges 37 come in contact with the rail heads. We accomplish this result by providing at each side of the car and adjacent the front and rear ends of the contact brush holder 17 a cam 40 (see Fig. 3) fixed to the under side of the car as by bracket 41—42 and having a two-part cam face 43—44 with which is adapted to engage a roller 45 carried on the upper end of a bracket 46 fixed to the contact brush holder. The springs 21 will maintain the rollers 45 in engagement with the cam 40 and as said rollers 45 move down the faces 43 the entire detector mechanism consisting of the contact brush holder 17 and the wheels 18 will be swung around pivots 34 inwardly with respect to the tracks. As the rollers 45 reach the bottom of cam faces 43, wheels 18, which normally extend downwardly from contact brush holder 17, are designed to just touch the rails and thereafter as said rollers 45 ride down oppositely inclined faces 44 the said detector mechanism is swung outwardly again by the pressure of spring 21 until the flanges 30 strike the rail heads. It will thus be seen that during the very last portion of the movement when the contact brush holder 17 is completing the last portions of its downward movement into engagement with the rails, the wheels 18, which had previously engaged the rail heads, are now moved upwardly with respect to the contact brush holder, as the latter completes its downward movement, and outwardly until the flanges 30 strike the rail heads. A further cam face 47 is provided on each cam member 40 to prevent rollers 45 from passing beyond the cam to an inoperative position. A flange 48 on the cam member 40 acts as a buffer to limit the backward movement of the contact brush holder caused by drag thereof on the rail.

In the above description it will be noted that the wheels on the inside of a curve, which would ordinarily land with the wheel flanges on the rail or outside of the rail, are moved inwardly to insure the wheel flanges falling between the rails. At the same time the outside wheels whose flanges would normally fall within the rails are moved still further inwardly but this does not result in the outside wheels falling within the rail and out of contact therewith because the peripheries of the wheels are very broad, running as high as seven or eight inches in width.

In cases where the degree of curvature is so great that there is danger of the wheels on the outside of the curve leaving the track all together, we provide the form of the invention disclosed in Figs. 1, 5 and 6. In this form, instead of the cams 40 and their supporting struts 41 and 42 being fixed to the bottom of the car, they are pivotally connected thereto, and all of the cam members at both sides are interconnected by a horizontal frame 50 (see Figs. 5 and 6) so that all of the cam members will swing together with a parallel motion. The said frame is designed to be located with respect to the rails by means of a pair of auxiliary locator wheels 60 which are pivoted at 61 in arms or members 62 so that they may be raised or lowered by means of a cable 63 extending into the car so that it may be wound upon a drum 64 by a handwheel 65 against the action of a
restoring spring 66. The said arms 62 are connected to the frame 50 at their lower ends and pivoted beneath the car body at 70 so that when the frame 50 is swung it will be swung about the four pivots 70. By looking through an observation window 71 in the floor of the car the operator can swing the said frame 50 about the said pivots by operating a handle (not shown) fixed to a shaft 72 which carries a crank 73 pivoted to a cross bar 74 attached to the frame 50. It will be seen that by rotating shaft 72 the operator within the car can swing the entire frame 50 and hence the locator wheel 60 until said wheels are directly over the rails and said wheels may then be lowered by rotating hand wheel 65. With the wheel 60 in engagement with the rails the wheels 18 will have correspondingly located with respect to said rails because the cams 40 which guide the movement of said wheels are likewise carried by the frame 50, so that while wheel 60 roughly locates the flaw detecting mechanism with respect to the rails, the cams 40 will serve to take care of the deviations of the wheels 18 due to ordinary curves. Instead of the supports 41—42 being fixed to the undersides of the car they are pivoted at 75—76 respectively.

In accordance with the provisions of the patent statutes, we have herein described the principle and operation of our invention, together with the apparatus which we now consider to represent the best embodiment thereof, but we desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use.

Having described our invention, what we claim and desire to secure by Letters Patent is:

1. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, and means whereby said mechanism during movement thereof to effective position is moved laterally so as to insure engagement thereof with said rails.

2. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, and means whereby said mechanism may be lowered to effective position, means whereby said mechanism is moved inwardly during movement thereof to effective position so as to insure engagement thereof with said rails.

3. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, and a cam, said mechanism engaging said cam during movement to effective and ineffective positions, said cam being so formed as to move said mechanism inwardly during movement thereof to effective position so as to insure engagement thereof with said rails.

4. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, said mechanism including a plurality of rail engaging members, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, means whereby said mechanism is moved inwardly during the downward movement thereof until said members engage the rail, and means whereby said mechanism is then moved outwardly.

5. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, said mechanism including a plurality of rail engaging members, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, a cam, said mechanism engaging said cam during movement to effective and ineffective positions, said cam having a plurality of faces of different inclinations whereby said mechanism is moved inwardly during the downward movement thereof until said members engage the rail and then moved outwardly.

6. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, said mechanism including a plurality of rails adapted to engage the rail, said rails having flanges, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, means whereby said mechanism is moved inwardly during downward movement thereof until said wheels engage the rail, and means whereby said mechanism is then moved outwardly until said flanges engage the rail.

7. In combination, a rail flaw detecting mechanism adapted to be mounted on a car, said mechanism including a plurality of rails adapted to engage the rail, said rails having flanges, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, a cam, said mechanism engaging said cam during movement to effective and ineffective positions, said cam having a plurality of faces of different inclinations whereby said mechanism is moved inwardly during the downward movement thereof until said members engage the rail and then moved outwardly until said flanges engage the rail.
8. In combination, a rail flaw detector car having a rail flaw detecting mechanism at each side thereof for engaging the respective rails, means whereby said mechanism may be raised to ineffective position, means whereby said mechanisms may be lowered to effective position, and means whereby said mechanisms are moved inwardly and toward each other during downward movement thereof.

9. In combination, a rail flaw detector car having a rail flaw detecting mechanism at each side thereof, each of said mechanisms having a plurality of rail engaging members, means whereby said mechanisms may be raised to ineffective position, means whereby said mechanisms may be lowered to effective position, and means whereby said mechanisms are moved inwardly and toward each other during downward movement thereof until said members engage the rails and are then moved outwardly and away from each other.

10. In combination, a rail flaw detector car having a rail flaw detecting mechanism at each side thereof, each of said mechanisms having a plurality of wheels adapted to engage the rails, each of said wheels having a flange, means whereby said mechanisms may be raised to ineffective position, means whereby said mechanisms may be lowered to effective position, and means whereby said mechanisms are moved inwardly and toward each other during downward movement thereof until said wheels engage the rails and are then moved outwardly and away from each other until said flanges engage the rails.

11. In combination, a rail flaw detector car having a rail flaw detecting mechanism movably connected therewith, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, a locator for said mechanism connected thereto, said locator being movably connected to said car and adapted to engage the rail for positioning said mechanism with respect to the rail.

12. In combination, a rail flaw detector car having a rail flaw detecting mechanism movably connected therewith, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, a locator for said mechanism connected thereto, means whereby said locator may be raised and lowered, and means whereby said locator may be moved laterally with respect to the car and the rail to engage the rail and position said mechanism with respect to the rail.

13. In combination, a rail flaw detector car having a rail flaw detecting mechanism movably connected therewith, means whereby said mechanism may be raised to ineffective position, means whereby said mechanism may be lowered to effective position, a locator for said mechanism connected thereto, means whereby said locator may be raised and lowered, and means whereby said locator may be moved laterally with respect to the car and the rail to engage the rail and position said mechanism with respect to the rail.

14. In combination, a rail flaw detector car having a rail flaw detecting mechanism at each side thereof for engaging the respective rails, means whereby said mechanisms may be raised to ineffective position, means whereby said mechanisms may be lowered to effective position, a frame interconnecting said mechanisms, said frame being pivoted on said car for movement laterally with respect to the car and the rails, a locator for said mechanisms connected to said frame, and means whereby said locator may be moved with respect to the car and the rails to engage the rails and position said frame and said mechanisms with respect to the rails.

15. In combination, a rail flaw detector car having a rail flaw detecting mechanism at each side thereof for engaging the respective rails, means whereby said mechanisms may be raised to ineffective position, means whereby said mechanisms may be lowered to effective position, and means whereby said mechanisms are moved inwardly and toward each other during downward movement thereof, a frame interconnecting said mechanisms, said frame being pivoted on said car for movement laterally with respect to the car and the rails, a locator for said mechanisms connected to said frame, and means whereby said locator may be moved with respect to the car and the rails to engage the rails and position said mechanisms with respect to the rails.

In testimony whereof we have affixed our signatures.

WALTER M. PERRY.
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