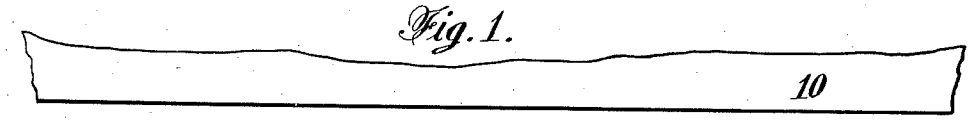
Dec. 5, 1933. G. L. JONES 1,937,760

FLAW DETECTOR CAR

Filed April 10, 1931

Fig. 1.



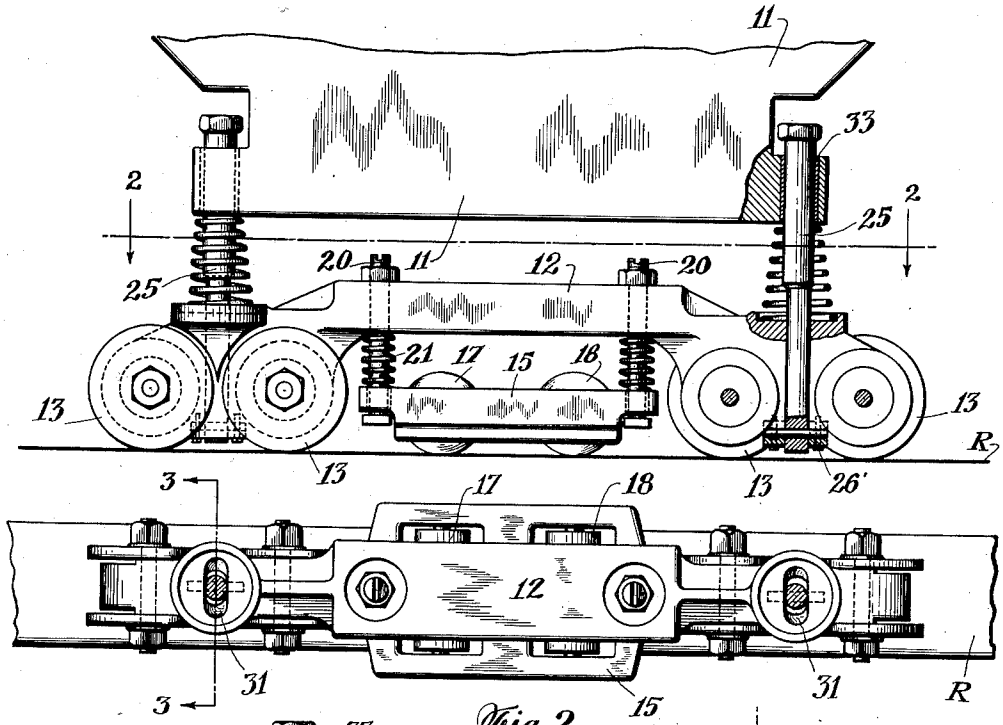


Fig. 2.

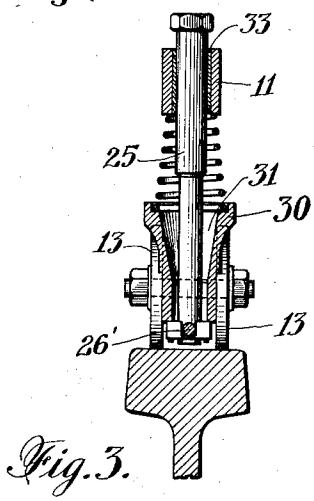


Fig. 3.

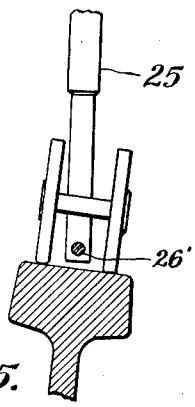


Fig. 5.

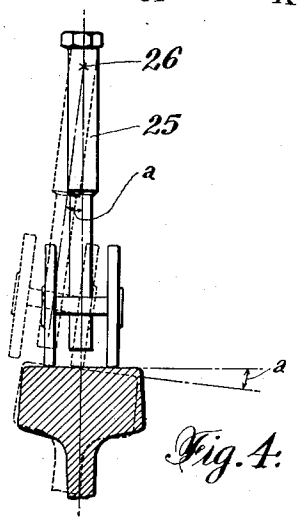


Fig. 4.

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FLAW DETECTOR CAR

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Application April 10, 1931. Serial No. 529,142

10 Claims. (Cl. 175—294)

This invention relates to a rail flaw detector mechanism of the type embodied in the Sperry rail flaw detector car, wherein a current is sent through the rail to be tested, thus establishing an electro-magnetic field surrounding the same, and a pair of opposed induction coils are operated in close proximity to the rail so that any flaw which causes the displacement of the axis of the current will induce an E. M. F. in the said opposed coils. In the Sperry car the current has been introduced into a rail through spaced sets of brushes carried by a main brush-holder carriage suspended from the body of the car and the said detector coils have been mounted upon a detector carriage suspended from said main brush carriage and riding upon the rail surface.

The practice has heretofore been to suspend the detector carriage from the main brush carriage from a point considerably removed from the rail surface, which construction resulted, in cases where the rail surface is inclined, or is given a predetermined cant—usually about 3°—, in a much exaggerated displacement of the detector carriage laterally with respect to the rail surface. Such displacement may result in an indication of a rail flaw where none in fact exists. It is the principal object of my invention, therefore, to provide an improved mounting for the detector carriage which will obviate the difficulty that has heretofore arisen and will maintain the detector unit parallel to the rail surface without appreciable lateral displacement regardless of the angle of inclination or cant of the upper surface of the rail.

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

In the accompanying drawing,

In Fig. 1 is a side elevation, partly sectioned vertically, of a portion of the detector mechanism as applied to a Sperry rail fissure detector car.

Fig. 2 is a section taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is a section taken substantially on the line 3—3 of Fig. 2.

Figs. 4 and 5 are views similar to Fig. 3, but largely diagrammatic, illustrating the theory underlying the present invention.

Referring first to Fig. 1, there is shown the body of a Sperry rail fissure car 10, from which is suspended, by means not shown, a main brush-holder carriage 11, designed to support a plurality of contact brushes (not shown) engageable with the rail to lead current into and out of the same, as shown in my co-pending application, Serial No. 502,161, filed December 13, 1930. A detector carriage 12 is mounted on the main brush-holder carriage 11, said carriage being provided with front and rear flanged wheels, not shown, operating on the rail surface R. On said detector carriage 12 is mounted the detector or pick-up unit indicated generally at 15, and comprising a pair of opposed induction coils housed within rollers 17, 18. The mounting of the detector unit 15 on the detector carriage 12 is by means of bolts 20 threaded into the detector carriage and slidably engaging the detector unit, with a spring 21 interposed between the detector unit and the detector carriage, whereby vertical movement of the unit 15 caused by irregularities in the surface of the rail is permitted.

The detector carriage 12 has heretofore been suspended from the main brush-holder carriage 11 by fixing a bolt 25 at its lower end to the detector carriage and pivotally mounting the upper end of the bolt in the main brush holder 11 at a point such as 26 (see Fig. 4). The result of this was that when an inclined surface of the rail was encountered, such as normal cant indicated in Fig. 4 by the angle a, the detector carriage, in order to maintain itself in right-angular engagement with the upper surface of the rail, necessitated the movement of bolt 25 about pivot 26, also through the angle a. The relatively large radius of movement from pivot 26 to the rail surface resulted in an appreciable lateral movement of the carriage at the rail surface, which displaced said carriage and, hence, the detector unit with the detector coils laterally with respect to the rail head. Such displacement gave indications similar to rail flaws and thus rendered the device inefficient.

I obviate the above difficulty, as shown diagrammatically in Fig. 5, by providing a mounting of detector carriage 12 on the main brush carriage 11, such that the pivot 26′ is very close to the rail surface and therefore angular movement of the carriage about pivot 26′ does not result in appreciable lateral displacement relative to said surface. Such mounting is shown in Figs. 1 to 3, inclusive, and consists in pivoting the lower end of bolt 25 on the pin 26′ fixed in the frame of detector carriage 12 to permit pivotal movement of the detector carriage around said pin. The rod extends upwardly through a bushing member 30 formed in the frame of detector carriage 12 to permit relative movement in the opening 31 thereof (see Figs. 2 and 3) between the detector carriage and the bolt when said carriage moves

around pivot 26' in response to inclination of the rail surface. The upper end of the bolt 25 is secured in the main brush carriage 11 within bushing 33.

The pivot 26' is so close to the rail surface that the carriage 12 and the coils may maintain a constant relationship to the rail surface regardless of the inclination of said surface without any appreciable lateral displacement because of the small radius of movement between pivot 26' and the rail surface. The amount of lateral displacement which would theoretically result at such radius is not transmitted to the coils because the pivot is so near the rail surface that the degree of displacement is less than the allowable accuracy of the necessary mechanical clearances between wheels 13 and the pick-up unit.

In accordance with the provisions of the patent statutes, I have herein described the principle and operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I 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 and elements 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 my invention, what I claim and desire to secure by Letters Patent is:

1. In a rail flaw detector mechanism, a detector carriage, a support therefor, and means whereby said carriage follows the inclinations of the rail surface without lateral displacement, said last-named means including a pivotal connection between said carriage and said support closely adjacent the rail surface and permitting pivotal movement of said carriage about an axis longitudinal with respect to the rail.

2. In a rail flaw detector mechanism, a detector carriage, a support therefor, and means whereby said carriage follows the lateral inclinations of the rail surface without lateral displacement, said last-named means including a longitudinal pivotal connection between said carriage and said support closely adjacent the rail surface and permitting pivotal movement of said carriage about an axis longitudinal with respect to the rail.

3. In a rail flaw detector mechanism, a carriage adapted to engage the rail surface, a support for said carriage, a detector unit mounted on said carriage, and means whereby said carriage and said unit follow the inclinations of the rail surface without lateral displacement of said unit, said last-named means including a pivotal connection between said carriage and said support closely adjacent the rail surface and permitting pivotal movement of said carriage about an axis longitudinal with respect to the rail.

4. In a rail flaw detector mechanism, a carriage adapted to engage the rail surface, a support for said carriage, a detector unit mounted on said carriage, and means whereby said carriage and said unit follow the lateral inclinations of the rail surface without lateral displacement of said unit, said last-named means including a longitudinal pivotal connection between said carriage and said support closely adjacent the rail surface.

5. In a rail flaw detector mechanism, a carriage adapted to engage the rail surface, a support for said carriage, a detector unit mounted on said carriage, and means whereby said carriage and said unit follow the inclinations of the rail surface without lateral displacement of said unit, said last-named means including a pivotal connection between said carriage and said support so closely adjacent the rail surface that the maximum lateral movement of said carriage is less than the necessary mechanical clearances between said carriage and said unit and permitting pivotal movement of said carriage about an axis longitudinal with respect to the rail.

6. In a rail flaw detector mechanism, a carriage adapted to engage the rail surface, a detector unit mounted on said carriage, and a support for said carriage including a member fixed at its upper end and pivotally connected to said carriage at its lower end so as to permit movement of said carriage about an axis longitudinal with respect to the rail.

7. In a rail flaw detector mechanism, a carriage adapted to engage the rail surface, a detector unit mounted on said carriage, and a support for said carriage including a member fixed at its upper end and pivotally connected to said carriage at its lower end closely adjacent the rail surface so as to permit movement of said carriage about an axis longitudinal with respect to the rail.

8. In a rail flaw detector mechanism, a carriage adapted to engage the rail surface, a detector unit mounted on said carriage, and a support for said carriage including a member fixed at its upper end and pivotally connected to said carriage at its lower end so closely adjacent the rail surface that the maximum lateral movement of said carriage due to inclination of the rail surface is less than the necessary mechanical clearances between said carriage and said unit, said pivotal connection being adapted to permit pivotal movement of said carriage about an axis longitudinal with respect to the rail.

9. In a rail flaw detector mechanism, a carriage having rollers adapted to engage the rail surface, a detector unit mounted on said carriage and a support for said carriage including a member fixed at its upper end and pivotally connected to said carriage at its lower end, at a point below the axis of said rollers.

10. In a rail flaw detector mechanism, a detector carriage having rollers adapted to engage the rail, a support therefor, and means whereby said carriage follows the inclinations of the rail surface without lateral displacement, said last-named means including a pivotal connection between said carriage and said support at a point below the axis of said rollers.

GEORGE L. JONES.