

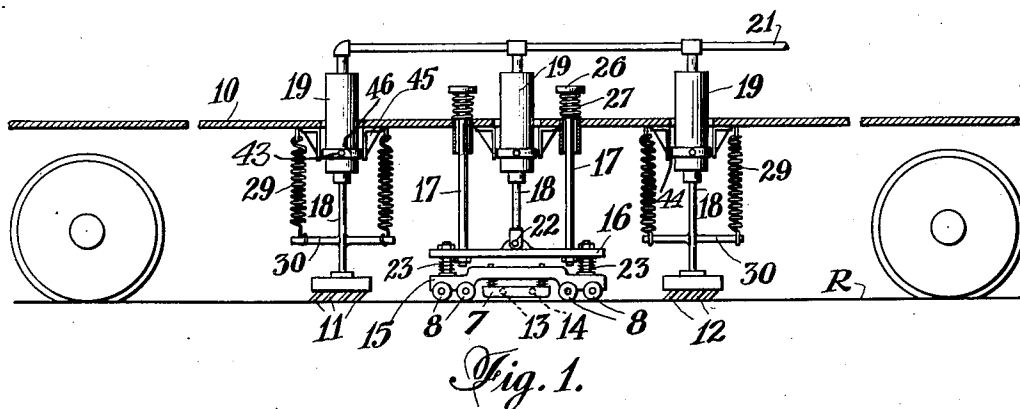
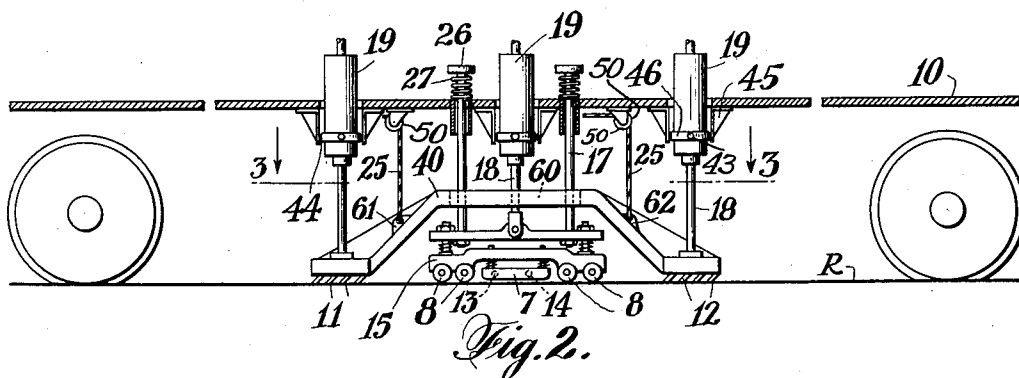
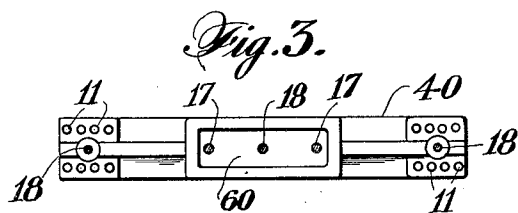
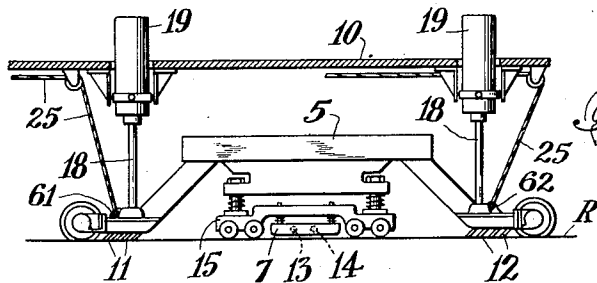
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FLAW DETECTOR MECHANISM

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FLAW DETECTOR MECHANISM

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This invention relates to rail flaw detector mechanisms as of the type disclosed in the patent to Elmer A. Sperry, No. 1,820,505, dated August 25th, 1931, in which the method of flaw detection employed consists in the passing of a heavy current through the rails by means of current contact brushes and having mounted in close proximity to the rail a pair of opposed detector coils. As the car moves along the rail these detector coils cut the lines of force in the electromagnetic field surrounding the rail, inducing a differential E. M. F. in the pair of opposed coils when a flaw is encountered. This E. M. F. is then amplified and caused to operate suitable indicating means.

This invention relates particularly to the mounting of the flaw detector mechanisms on the car, and more specifically to the mounting of the detector unit with respect to the current brushes.

Heretofore the practice has been to mount the detector unit, containing the detector coils, on a current brush carriage which supported the contact brushes for introducing current into and out of the rail. This brush carriage was in turn mounted on the body of the car.

It is the primary object of my invention to provide a mounting for the detector unit which shall be separate from and independent of the mounting of the current brushes, whereby the movements of the detector carriage may be made entirely independent of the movements of the brush carriage.

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

In the accompanying drawing,

Fig. 1 is a side elevation of the flaw detecting mechanism applied to a car, only a portion of which is shown, in section.

Fig. 2 is a view similar to Fig. 1, but showing another form of my invention.

Fig. 3 is a section of the Fig. 2 form of my invention taken substantially on the lines 3-3 of Fig. 2.

Fig. 4 is a view similar to Figs. 1 and 2 illustrating the present method of mounting the detector mechanism on a car.

To illustrate the principle underlying the method of flaw detection there is shown in Fig. 4, mounted on the body of a Sperry detector car 10, current brushes 11 and 12 in engagement with rail R for leading current, from a source of current (not shown), into and out of the rail. These current brushes are mounted on a current

brush carriage 5, which heretofore also supported a detector carriage 15, carrying a detector unit comprising a pair of opposed detector coils 13, 14, and a housing 7 therefor. Said coils 13, 14 cut the lines of force in the electromagnetic field surrounding the rail as the car is moved along the rail. The E. M. F.'s induced in the coils 13, 14 are balanced against each other so that unless a flaw is encountered there is no resultant E. M. F. obtained. When, however, a flaw in the rail is encountered a differential E. M. F. is induced which is then passed through an amplifier (not shown) and made to operate suitable indicating mechanism (not shown).

The current brush carriage 5, and hence also the detector carriage 15 supported thereby, is normally held in raised position by means of cables 25, one end of which is attached to a spring (not shown) and the other to opposite ends of the brush carriage 5 at points 61 and 62. The brush carriage 5 is lowered into effective position by means of piston rods 18, operating in fluid pressure cylinders 19. By this construction it will be seen that the detector carriage 15 is raised and lowered whenever the brush carriage 5 is raised or lowered.

The result of mounting the detector carriage on the current brush carriage has been a tendency for the detector carriage to follow and partake of the movements of the current brush carriage 5 due to irregularities in the rail surface. This sometimes resulted in an indication on the chart similar to that when a flaw is encountered and thereby confused the record.

I eliminate the above described difficulties by providing a mounting for the detector carriage separate from and independent of the current brush carriage. One form of my invention is shown in Fig. 1, wherein I have shown mountings of the current brushes 11 and 12 on the car-body 10 and a separate mounting directly on said car-body for the detector carriage 15.

The current brushes 11 and 12 are mounted in car-body 10 by means of piston rods 18 which operate in fluid pressure cylinders 19. These cylinders may be mounted on the car 10 for universal movement by means such as pivots 43 in a ring 46, which may in turn be mounted in pivots 44 at right angles to first pivot in brackets 45. Current brushes 11 and 12 may be lowered into engagement with the rail by means of fluid pressure such as compressed air, supplied to the cylinders 19 through tube 21 from a source of supply (not shown) against the action of retracting springs 29, connected at one end to the car-

body and at the other end to the piston rods 18 by means such as cross-bar 30.

The detector carriage 15 is mounted directly on the car-body by means of rods 17 which extend loosely through openings 9 in the floor of the car 10, and have at their upper ends collars 26 which act as a stop for springs 27 positioned between said collars 26 and the floor of the car, said springs tending to raise the detector carriage to ineffective position. The lower end of said rods 17 may be fastened to crosshead 16 which supports the detector carriage 15, carrying the detector unit 7. Said detector carriage 15 may be provided with rollers 8 or slides in order to maintain the coils contained in the detector unit in close proximity to and at a constant distance from the rail at all times. Detector carriage 15 may be supported on crosshead 16 by means such as bolts 23 extending slidably through the crosshead 16.

By this construction the detector carriage 15 is normally held in raised position, out of engagement with the rail, and may be lowered into operative position by fluid pressure means similar to that used for lowering current brushes 11 and 12, namely, fluid pressure supplied to cylinder 19 to operate a piston rod 18 against the action of retracting springs 27. The piston rod 18 may be connected to crosshead 16 for freedom of motion by such means as universal joint 22 which allows the detector mechanism to follow the contour of the rail. Relative movement between crosshead 16 and the detector carriage 15 may be obtained by means of spring connections 23.

In Fig. 2, I have shown a modified form of my invention in which there is provided a mounting for the detector mechanism similar to the Fig. 1 form, but there is shown in place of the two separate sets of brushes 11 and 12 having separate supports, a single brush carriage 40 having at one end brushes 11, and at the other end brushes 12. Carriage 40 is provided with a central opening 60, shown in Fig. 3, which is large enough to permit piston rods 18 to extend freely therethrough, so that the operation of the brush carriage 40 will in no way affect the detector mechanism. The brush carriage 40 is normally held in raised position by such means as cables 25, one end of which may be fastened to a retracting spring (not shown) and then run over pulleys 50 and fastened to opposite ends of brush carriage 40, at points 61 and 62. To lower brush carriage 40 into operative position, I may employ the same fluid pressure means as shown in the Fig. 1 form of my invention, actuating piston rods 18 operating in cylinders 19.

Thus it will be seen from the foregoing description of my invention that I have provided a mounting for the detector carriage on the car-body and entirely independent of the mounting of the current brush carriage. Each of these carriages may be raised and lowered to ineffective and effective positions independently of the other carriage.

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 flaw detector adapted to be mounted on a car, a current brush carriage, a detector carriage, and means for supporting said carriages on said car independently of each other, said last named means including means whereby said carriages may move relative to said car.

2. In a flaw detector adapted to be mounted on a car, a current brush carriage, a detector carriage, and means for supporting said detector carriage on said car independently of said current brush carriage, said last-named means including means whereby said detector carriage may move relative to said car.

3. In a flaw detector adapted to be mounted on a car, a plurality of current brush carriages, a detector carriage, and means for supporting said carriages on said car independently of each other, said last-named means including means whereby said carriages may move relative to said car.

4. In a flaw detector adapted to be mounted on a car, a current brush carriage and a detector carriage, means for actuating each of said carriages to effective and ineffective positions and means whereby said carriages are supported from said car so that each of said carriages may be actuated independently of the other.

5. In a flaw detector adapted to be mounted on a car, a current brush carriage and a detector carriage, means for actuating each of said carriages to effective and ineffective positions, and means including independent supports of said carriages on said car whereby each of said carriages may be actuated independently of the other.

6. In a rail flaw detector adapted to be mounted on a car, a current brush carriage having spaced contacts adapted to engage the rail, a detector carriage adapted to engage the rail between said spaced contacts, and means for supporting each of said carriages on said car independently of the other, each of said supporting means including a pivotal connection whereby the respective carriage may follow the lateral and longitudinal irregularities of the rail.

7. In a rail flaw detector adapted to be mounted on a car, a current brush carriage having spaced contacts adapted to engage the rail, a detector carriage adapted to engage the rail between said spaced contacts, and means for supporting each of said carriages on said car independently of the other, the supporting means for said detector carriage extending freely through said current brush carriage.

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