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RAIL FISSURE DETECTOR

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Fig. 1.

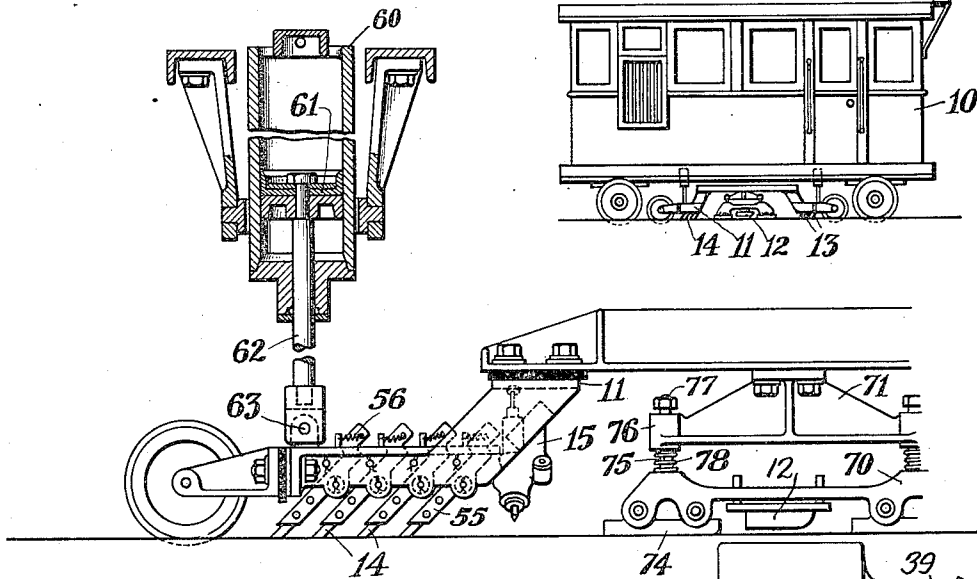
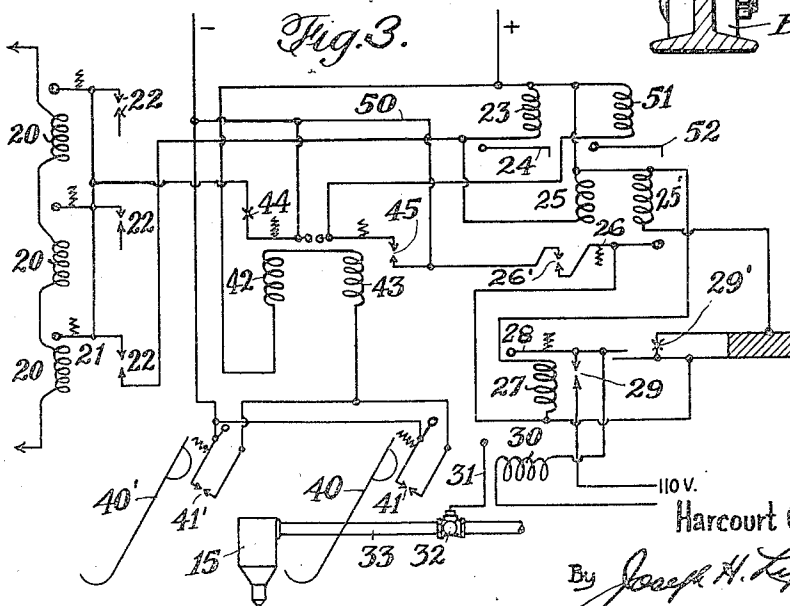


Fig. 2.

Fig. 4.



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RAIL FISSURE DETECTOR

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poration of New York

Original application March 18, 1930, Serial No.
436,660, now Patent No. 1,912,569, dated June
6, 1933. Divided and this application Febru-
ary 4, 1933, Serial No. 655,223

12 Claims. (Cl. 175-183)

This application is a division of my co-pending application, Serial No. 436,660, filed March 18, 1930, which has matured into Patent No. 1,912,569, granted June 6, 1933.

This invention relates to improvements in rail fissure detectors of the type adapted to be mounted on a moving car.

More specifically it is one object of this invention to insure operation of the paint gun which is employed for marking the spot on a rail where a fissure occurs. It has been found in practice that the very short energization of the detecting mechanism caused by the relatively rapid movement of the detector mechanism over a fissure was sometimes insufficient to actuate the paint gun operating mechanism. By my invention such operation is insured.

It is a further object of my invention to provide means for preventing operation of the paint gun when the detector mechanism passes over the rail joints. I accomplish this function without preventing actuation of the usual recorder on the recording chart for indicating rail joints. For this purpose I employ a mechanical means designed to engage the angle bar which connects the rails at the joints. I provide means also for insuring that the paint gun will not be operated until the recording mechanism has passed completely beyond the said angle bar.

Heretofore the paint gun has been mounted on the car body and this has resulted in the "wiping off" of the gun by obstructions in the path of travel of the car. By my invention I propose to mount the paint gun on the contact brush holder which is lifted to a protected inoperative position when obstructions are met.

It is a further object of my invention to mount the paint gun sufficiently behind the detector brushes to compensate for the speed of the car and the time lag of the paint gun operating mechanism.

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

In the accompanying drawing,

Fig. 1 is a side elevation of a Sperry detector car, showing generally the location of the principal elements of the detector mechanism.

Fig. 2 is an enlarged detail, partly sectioned vertically, of a portion of the contact brush holder and detector mechanism.

Fig. 3 is a diagrammatic view disclosing the means for preventing operation of the paint gun when the detector mechanism passes over rail joints.

Figure 4 is an end view of the brush holder showing the joint cut-out finger.

Referring to Fig. 1, there is shown a Sperry rail detector car 10 having a contact brush carriage or holder 11 and a detector sled 12 supported on said holder 11. The contact brushes 13-14 carried by the contact brush holder 11 are designed to lead high amperage current into the rail and the coils in the detector sled are designed to pick up any variations in flux caused by flaws and transmit the same through an amplifier to a recording mechanism as disclosed in the patent of Elmer A. Sperry, No. 1,820,505 granted August 25, 1931. The amplifying means is also designed to energize a mechanism for operating a paint gun 15 for squirting paint upon the rail at the point where a flaw or fissure is detected by the detector mechanism. To insure operation of the paint gun 15 when passing over a rail flaw or fissure, I provide the mechanism disclosed in Fig. 3. The normal paint gun operating mechanism is shown as comprising an electro-magnet 20 energized from the amplifying system, said magnet attracting its armature 21 to close a set of contacts 22, to close a circuit extending from the plus sign through magnet 23, contacts 22, contacts 44, to the minus sign thus energizing electro-magnet 23 which attracts its armature 24 to actuate a recording pen carried thereby. The closing of contacts 22 also energizes electro-magnet 25, in parallel with the circuit just traced, which attracts its armature 26 to close the circuit through electro-magnet 27, which then attracts its armature 28 to close contacts 29. This permits full voltage from a main supply source of 110 volts to be applied to an electro-magnet 30 which attracts its armature 31 to operate a valve 32 to permit air pressure to pass into pipe 33 and discharge paint from gun 15 on the track.

In order to insure operation of the paint gun when passing over a flaw, I provide an additional winding 25' which is energized at the same time as winding 25. When the detector mechanism has passed over the flaw and contacts 22 open to deenergize coil 25, coil 25' will still be energized because it will be seen that it has an independent circuit extending through armature 26, contacts 26' and the conductor 50 to the negative side of the line. Once coils 25 and 25' are energized, therefore, coil 25' will hold the armature 26, even though contacts 22 open to maintain the circuit through coils 27 and 30 until armature 28 has been fully drawn down to open contacts 29' and thus break the circuit through electro-magnet 25'. The full movement of ar-

mature 28, however, insures the operation of the paint gun.

It will be seen that contacts 29' are not in series with magnet 27 but said contacts 29' are in a parallel circuit. If contacts 29' were in series with magnet 27 then opening of contacts, 29' would cause deenergization of the magnet 27, release of armature 28 and closing of contacts 29'. The contacts 26' do not open as quickly as contacts 29' owing to the lag in deenergizing magnet 25' and releasing armature 26. So that contacts 29' will have closed again before contacts 26' have opened, and, if contacts 29' and magnet 27 were connected in series, the magnet 27 would again be energized and thus set up a chattering of armature 28. But by connecting contacts 29' in a parallel circuit, opening of said contacts does not deenergize magnet 27 until contacts 26' are opened, and chattering of armature 28 is thus prevented.

Referring to Figs. 3 and 4, I have disclosed also a means for preventing operation of the said paint gun 15 when the detector mechanism passes over a rail joint, since obviously magnetic flux variation, due to a rail joint, would tend to operate the paint gun operating mechanism in the same manner as a flaw or fissure within the rail. For this purpose I provide a lever 40 mechanically pivoted on holder 11 at 39 so supported as to engage the angle bar B at the side of the rail and connecting the two rails at the joint. As lever 40 engages the angle bar it closes a set of contacts 41 to energize coils 42 and 43 to open contacts 44 and close contacts 45. The opening of contacts 44 prevents energization of electro-magnet 25 and 25' and hence of the circuit through magnet 27 and magnet 30, while the closing of contacts 45 closes the circuit through electro-magnet 51 to actuate the armature 52 which operates the joint recording pen on the chart. The opening of contacts 44 serves also to break the circuit through coil 23 so that the fissure-recording pen will not be actuated when the detector passes over a rail-joint.

Since the lever 40 would normally disengage the angle bar before the detector sled has passed beyond the rail joint, I provide a second lever 40' so positioned with respect to lever 40 that it will engage the angle bar before lever 40 has left the bar to close a set of contacts 41' in parallel with contacts 41 to perform the same function and continue the action of contacts 41 in preventing operation of the paint gun 15 until the detector sled has passed entirely beyond the rail joint.

Referring to Fig. 2 it will be observed that I have mounted the paint gun 15 on the contact brush holder 11 so that it will be raised and lowered together with said holder. Heretofore the paint gun was mounted on the car body and was frequently wiped off by obstructions at the side of the path of travel of the car. By the construction shown in Fig. 2, this is impossible and the paint gun is at all times maintained in a safe position.

Referring to the same Fig. 2, it will be observed that the paint gun 15 is mounted a certain distance behind the detector sled 12. This distance is so proportioned that the speed of the car and the lag in operation of the paint gun operating mechanism will be compensated for by the distance which the paint gun 15 must travel before reaching the flaw picked up by the sled 12.

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 device adapted to move over the rails for detecting rail flaws, in combination, flaw indicating mechanism, means responsive to flaw adapted to actuate said indicating mechanism, said rails having joints, said flaw responsive means responding also to joints, a second means responsive to said rail joints, and means whereby said second responsive means renders said flaw indicating means ineffective while the first responsive means is in a position to be affected by a rail joint.

2. In a device adapted to move over the rails for detecting rail flaws, in combination, flaw indicating mechanism, means responsive to flaw adapted to actuate said indicating mechanism, said rails having joints, said flaw responsive means responding also to joints, a second means responsive to said rail joints, and means whereby said second responsive means renders said flaw indicating means ineffective, said second responsive means being so positioned relative to said flaw responsive means as to render said flaw indicating mechanism ineffective while said flaw responsive means is passing over a rail joint.

3. In a device adapted to move over the rails for detecting rail flaws, in combination, flaw indicating mechanism, means responsive to flaw adapted to actuate said indicating mechanism, said rails having joints, said flaw responsive means responding also to joints, a second means responsive to said rail joints, said last-named means including means for mechanically engaging said rail joints while said flaw responsive means passes over said joints, and means whereby said mechanical engagement renders said flaw indicating mechanism ineffective.

4. In a device adapted to move over the rails for detecting rail flaws, in combination, flaw indicating mechanism, means responsive to flaw adapted to actuate said indicating mechanism, said rails having joints including angle bars, said flaw responsive means responding also to rail joints, a second means responsive to said rail joints, said last-named means including means for mechanically engaging said angle bars while said flaws responsive means passes over said joints, and means whereby said mechanical engagement renders said flaw indicating means ineffective.

5. In a device adapted to move over the rails for detecting rail flaws, in combination, flaw indicating mechanism, means responsive to flaw and means including an electric circuit whereby said flaw responsive means actuates said indicating mechanism, said rails having joints, said flaw responsive means responding also to rail joints, a second means responsive to said rail joints, and means whereby said second means renders said circuit ineffective while the first responsive means is in a position to be affected by a rail joint.

6. In a device adapted to move over the rails for detecting rail flaws, in combination, flaw indi-

5 cating mechanism, means responsive to flaw and
means including an electric circuit whereby said
flaw responsive means actuates said indicating
mechanism, said rails having joints, said flaw re-
sponsive means responding also to rail joints, a
10 second means responsive to said rail joints, and
means whereby said second means renders said
circuit ineffective, said second responsive means
being so positioned relative to said flaw responsive
means as to render said circuit ineffective while
15 said flaw responsive means is passing over a rail
joint.

7. In a device adapted to move over the rails
for detecting rail flaws, in combination, flaw in-
dicating mechanism, means responsive to flaw
and means including an electric circuit whereby
said flaw responsive means actuates said indicat-
ing mechanism, said rails having joints, said
20 flaw responsive means responding also to rail
joints, a second means responsive to said rail
joints, said last-named means including means
for mechanically engaging said rail joints while
said flaw responsive means passes over said joints,
and means whereby said mechanical engagement
25 renders said circuit ineffective.

8. In a device adapted to move over the rails
for detecting rail flaws, in combination, flaw in-
dicating mechanism, means responsive to flaw
and means including an electric circuit whereby
said flaw responsive means actuates said indicat-
ing mechanism, said rails having joints, includ-
30 ing angle bars, said flaw responsive means re-
sponding also to rail joints, a second means re-
sponsive to rail joints, said last-named means in-
cluding means for mechanically engaging said
angle bars while said flaw responsive means passes
over said joints, and means whereby said me-
chanical engagement renders said circuit inef-
fective.

9. In a device adapted to move over the rails
for detecting rail flaws, in combination, flaw in-
dicating mechanism, means responsive to flaw
and means including an electric circuit whereby
said flaw responsive means actuates said indi-
cating mechanism, said rails having joints, in-
45 cluding angle bars, said flaw responsive means
responding also to rail joints, a second means re-
sponsive to rail joints, said last-named means in-
cluding a pair of spaced levers adapted to engage
said angle bars successively for a period com-
50 mencing before said flaw responsive means
reaches said joint and continuing until said flaw
responsive means passes beyond said joint, and
means whereby said engagement renders said cir-
cuit ineffective.

10. In a device adapted to move over the rails
for detecting rail flaws, in combination, flaw in-
dicating mechanism, means responsive to flaw
adapted to actuate said indicating mechanism,
60 said rails having joints, said flaw responsive
means responding also to joints, a second means
responsive to said rail joints and positioned in

advance of said flaw responsive means, means
whereby said second responsive means when in
cooperative relation with a rail joint renders said
flaw indicating means ineffective, and means for
maintaining said flaw indicating means ineffec-
5 tive after said second responsive means has
passed out of cooperative relation with the re-
spective rail joint and until said flaw responsive
means has passed beyond said rail joint.

11. In a device adapted to move over the rails
10 for detecting rail flaws, in combination, flaw in-
dicating mechanism, means responsive to flaw
adapted to actuate said indicating mechanism,
said rails having joints, said flaw responsive
means responding also to joints, a second means
15 responsive to said rail joints and positioned in
advance of said flaw responsive means, means
whereby said second responsive means when in
cooperative relation with a rail joint renders said
flaw indicating means ineffective, and means for
20 maintaining said flaw indicating means ineffec-
tive after said second responsive means has
passed out of cooperative relation with the re-
spective rail joint and until said flaw responsive
means has passed beyond said rail joint, said last-
25 named means comprising a third means respon-
sive to said rail joints and positioned so as to
move into cooperative relation with the respec-
tive rail joint as said second responsive means
moves out of cooperative relation therewith and
30 means whereby said third responsive means ren-
ders said indicating means ineffective when in
cooperative relation with a rail joint.

12. In a device adapted to move over the rails
35 for detecting rail flaws, in combination, flaw in-
dicating mechanism, means responsive to flaw
adapted to actuate said indicating mechanism,
said rails having joints, said flaw responsive
means responding also to joints, a second means
40 responsive to said rail joints and positioned in
advance of said flaw responsive means, means
whereby said second responsive means when in
cooperative relation with a rail joint renders said
flaw indicating means ineffective, and means for
45 maintaining said flaw indicating means ineffec-
tive after said second responsive means has
passed out of cooperative relation with the re-
spective rail joint and until said flaw responsive
means has passed beyond said rail joint, said
50 last-named means comprising a third means re-
sponsive to said rail joints, said third responsive
means being positioned to the rear of said flaw
responsive means and so positioned relative to
said second responsive means as to move into
55 cooperative relation with the respective rail joint
as said second responsive moves out of coopera-
tive relation therewith and means whereby said
third responsive means renders said indicating
means ineffective when in cooperative relation
60 with a rail joint.

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