

[54] **DEVICE FOR LUBRICATING WHEEL FLANGES OF RAILWAY VEHICLES**[76] Inventor: **Prem Chandra Luthar**, South Eastern Railway Colony, Calcutta, India[22] Filed: **July 23, 1970**[21] Appl. No.: **57,682**[52] U.S. Cl. **184/3 R, 200/166 BB**[51] Int. Cl. **B61k 3/00**

[58] Field of Search 184/3 R, 2, 56 R, 184/56 A, 6.26, 67; 200/166 BB

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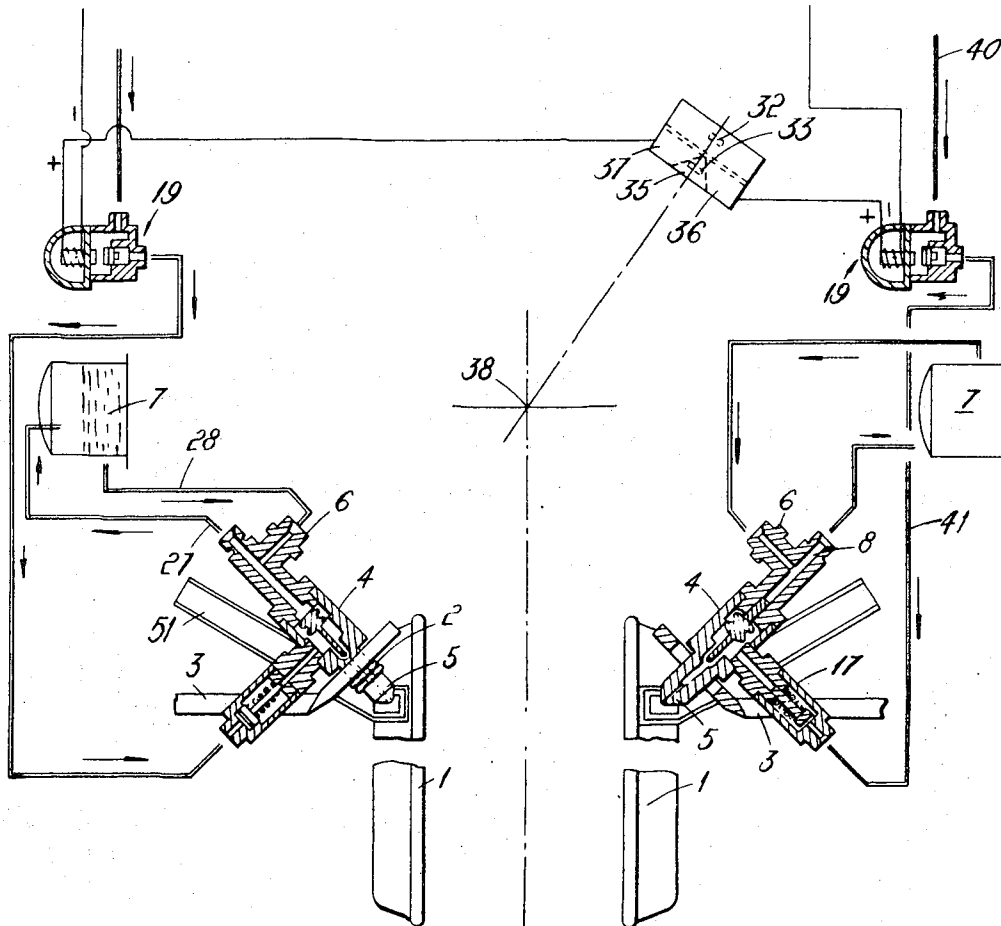
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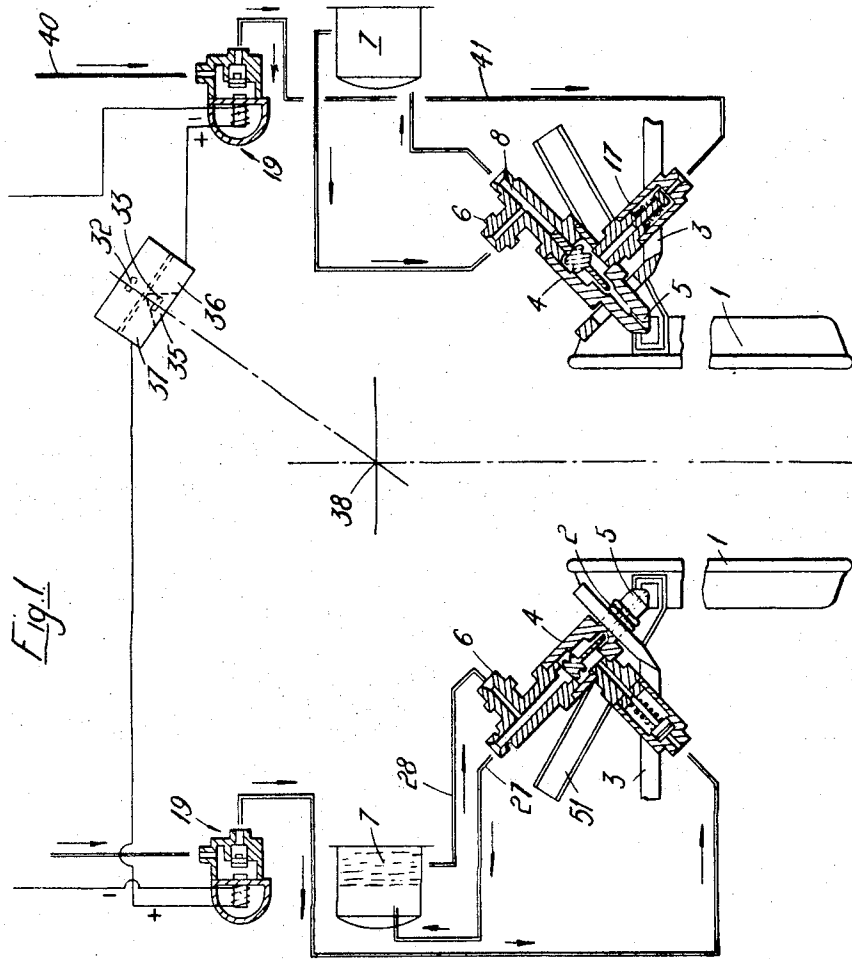
[57] **ABSTRACT**

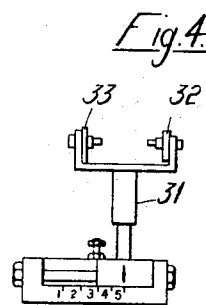
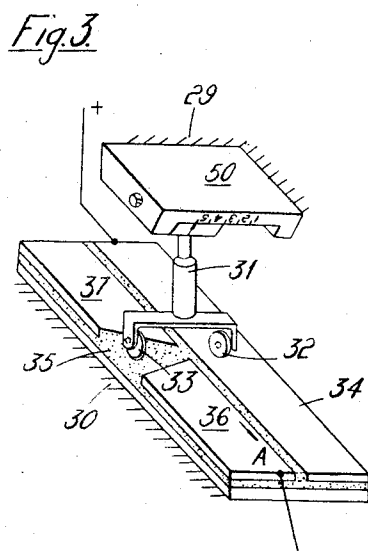
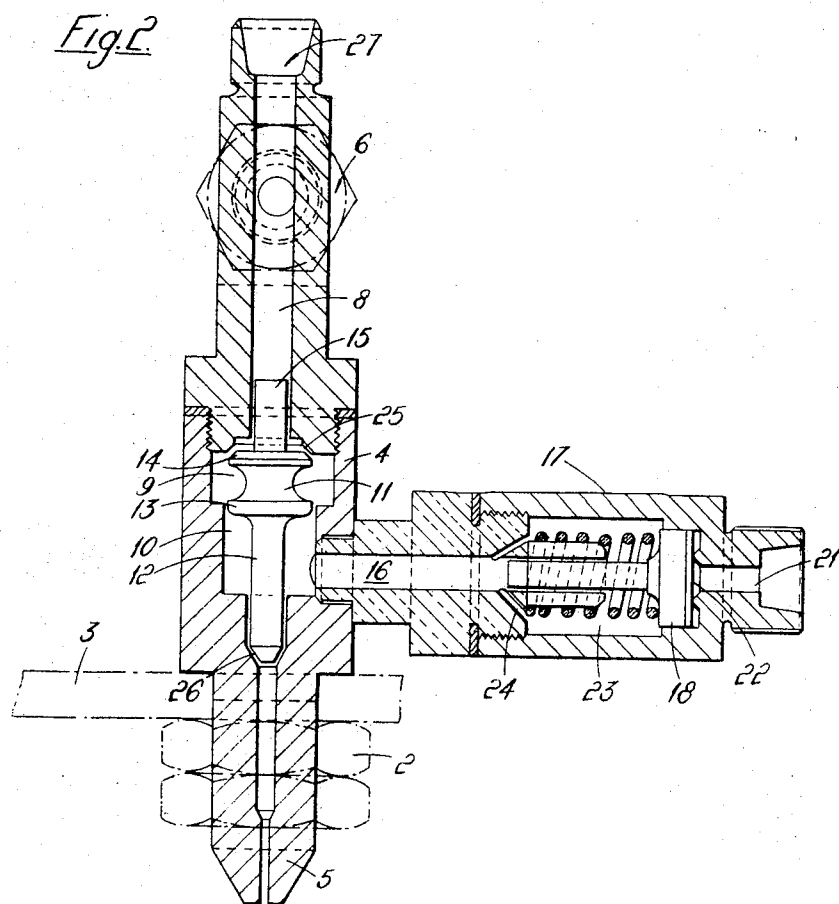
A system for lubricating the wheel flanges of railway vehicles (locomotives and railway cars) while negotiating a curve, in order to inhibit wear on flanges and rails and simultaneously ensure smooth guidance around curves.

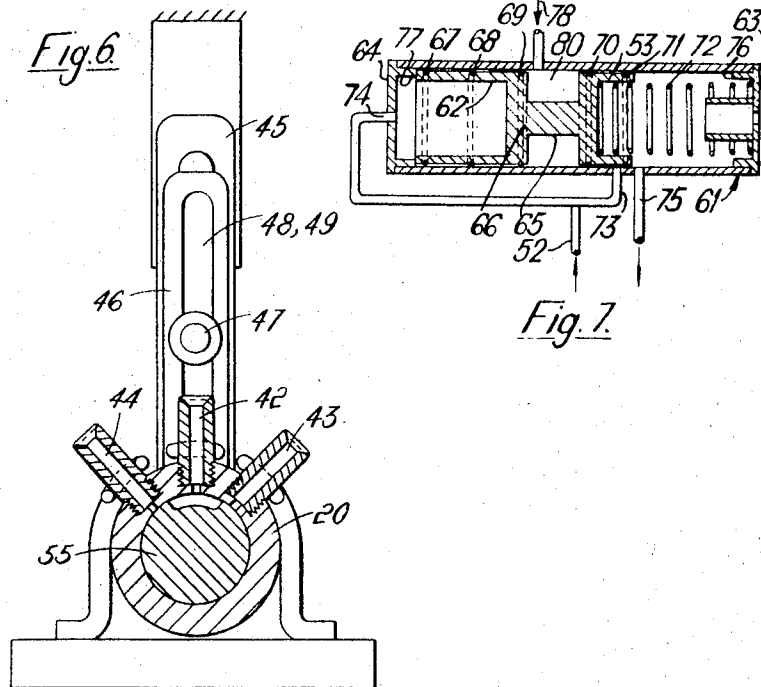
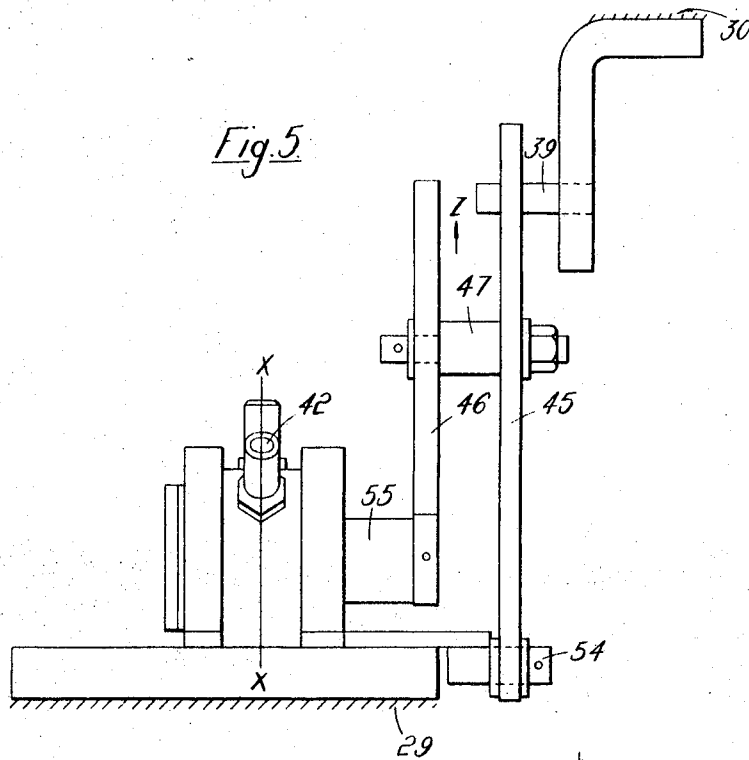
Oil spray nozzles are positioned adjacent the wheel flanges of the vehicle and the relative displacement between the bogie frame and the undercarriage of the vehicle causes compressed air to be supplied to the oil nozzles to spray the oil on the flanges.

The improvement in such a system comprises the provision of means for adjusting the control means for supplying compressed air to the spray nozzle assembly to function at various radii of curvatures of the track.

1 Claim, 7 Drawing Figures







DEVICE FOR LUBRICATING WHEEL FLANGES OF RAILWAY VEHICLES

PRIOR ART

In order to reduce the wear on flanges of locomotive wheels, it has been the practice to install lubricating devices on curved tracks which devices function when the wheel passes over such track. Such a system has not been found to be satisfactory because of the neglect in replenishing the said devices with grease and the tendency of the grease to creep to the wheel tread and the rail top thereby lowering adhesion between the wheel and the rail and rendering the vehicle vulnerable to failure.

Another system is to lubricate the roots of the flanges by spring loaded graphite blocks mounted on the vehicle. This system has also not been found to be effective in practice.

OBJECT

The invention has for its object to propose a device which should function every time the vehicle enters a curve and that preferably only a metered quantity of lubricant should be directed to the root of the wheel flange. At the same time, any possibility of the lubricant creeping on to the wheel tread or the rail face should be avoided.

The device should be capable of functioning at various track curvatures normally found in actual practice.

INVENTION

According to this invention, the device for lubricating the wheel flanges of a vehicle comprises a pneumatically operated oil sprayer, one for each leading wheel on the left and right of the vehicle, means for supplying oil to the said sprayers, source of compressed air connected to the said sprayers through control means for the supply of compressed air to the said sprayers, said control means being actuated by and responsive to the relative displacement between the bogie frame and the undercarriage of the vehicle caused by the vehicle itself while negotiating a left or a right hand curve whereupon compressed air is released for supply to the oil sprayer at the left or right hand wheel of the vehicle.

In one preferred embodiment, the device comprises a spray nozzle assembly, an oil chamber within said nozzle assembly for storing a certain quantity of oil received from an oil reservoir, an air delivery valve for supplying compressed air connected to the said nozzle assembly, control means for supplying compressed air to the said air delivery valve, a valve head for controlling the supply of stored oil in said oil chamber to the nozzle of the spray nozzle assembly, said valve head being actuated to supply the stored oil only when compressed air acts on the valve head, said control means for supplying compressed air to the air delivery valve being responsive to and actuated by the displacement caused between the bogie frame and the undercarriage of the vehicle, the arrangement being such that when the vehicle is traversing a straight track, the said control means are inoperative and there is no supply of compressed air to the air delivery valve while the oil is allowed to flow into the said oil chamber but when the vehicle enters a curve, the control means cause the compressed air to be released to the air delivery valve and from there to the spray nozzle assembly, with the

result that the oil stored in the oil chamber is supplied to the nozzle so that by the help of compressed air, the said stored oil is sprayed pneumatically at the root of the flange, only such quantity of oil being sprayed which was delivered by the oil chamber to the said nozzle, the control means stopping the supply of compressed air when the vehicle enters a straight track.

Control means for controlling the supply of compressed air to the said air delivery valve in one form comprise a lever connected between the bogie frame and the undercarriage of the vehicle, said lever being actuated when the locomotive negotiates a curve due to the relative displacement of the bogie with respect to the undercarriage of the vehicle, said lever operating in turn a three-way cock to admit compressed air to the air delivery valve connected to the spray nozzle on the left or on the right of the vehicle depending upon whether the vehicle is negotiating a left handed or a right handed curve.

As an alternative to a lever and three-way cock, the control means for supply of compressed air to the air delivery valve comprise electro-pneumatic valves on the right and left of the vehicle respectively, one of said valves being energized through a pair of contact rollers which are operated as a result of displacement between the undercarriage and the bogie frame and cause the current to flow to the said electro-pneumatic valve to allow the passage of compressed air to the air delivery valve.

The control means are made adjustable to be able to function for any curvature of the rail met in practice.

DESCRIPTION WITH RESPECT TO DRAWINGS

FIG. 1 shows complete diagram to illustrate how the device will function employing electro-pneumatic valves as a control means for the supply of compressed air.

FIG. 2 shows in section the spray nozzle assembly with air delivery valve.

FIG. 3 shows in perspective the arrangement for operating the electro-pneumatic valves, as a result of displacement between the undercarriage and the bogie frame.

FIG. 4 shows the arrangement for adjusting the position of the contact rollers of FIG. 3.

FIG. 5 shows an arrangement for operating a three-way cock.

FIG. 6 shows section along X—X in FIG. 5

FIG. 7 shows a further embodiment of the spray nozzle assembly.

Referring to FIG. 1 which shows the complete assembly, 1 are the leading wheels of a vehicle (not shown). The device for spraying oil lubricant in atomized form is shown as provided on both the wheels.

3 are the brackets and 2 the nuts by which the spray nozzle assemblies are secured to the bogie frame in proximity to the wheel flange. 4 shows the main body of the spray nozzle assembly. 5 is the spray nozzle. 6 shows an adapter for feeding oil from a reservoir or container 7 into the oil inlet passage 8 of the body 4.

Within the body 4 are formed two chambers marked 9 and 10 being the first and the second chambers respectively. Within the chamber 9 which forms the oil storage chamber and extending to chamber 10 is located a valve body 11 which comprises a pintle valve 12, a piston 13, a valve head 14, and a fluted guide 15 engaging the oil inlet 8.

Opening into the chamber 10 is an air delivery passage 16 from an air delivery valve body 17 in which body is housed a snap action valve. The body 17 is connected to a source of compressed air either through air supply control means comprising an electro-pneumatic valve 19 or a three-way distributor cock 20 to be described later.

Referring to the construction of the air delivery valve, it has a valve head 18 of the snap action type being loaded by a spring. The valve head keeps the air passage 21 always sealed except when compressed air is allowed to enter the said passage 21. The area of the seat 22 is smaller than the area of valve head 18. Consequently, as the valve head 18 lifts slightly under the influence of compressed air, a larger area, mainly the entire area of the valve head 18 gets exposed to compressed air with the result that the valve pops open with snap action admitting a gush of compressed air into the passage 16 via chamber 23 and holes 24.

When compressed air enters chamber 10, it acts at the bottom of piston 13 thereby lifting the valve body 11. In this position the piston 13 is lifted clear of chamber 10, valve head 14 gets seated against seat 25 to block the oil passage 8, pintle valve 12 lifts off its seat 26 to clear the nozzle passage and the oil that is stored in oil chamber 9 flows into chamber 10 and is forced out by the help of compressed air entering through passage 16.

27 is a vent pipe leading from the oil inlet passage 8 into the reservoir 7 and opening above the oil level as shown. The vent pipe serves a two-fold purpose viz., prevention of air locks in oil delivery pipe 28 and to force back any oil which is trapped in passage 8 into the reservoir 7.

COMPRESSED AIR CONTROL MEANS

When a vehicle enters a curve, relative displacement occurs between the bogie frame 29 and the undercarriage or underframe 30 of the vehicle. To the bogie frame is secured a base plate 50 to which is fitted a contact carrier comprising a contact post 31 and a pair of contact rollers 32 and 33. Roller 32 is always in contact with a contact plate 34 connected to one terminal of the electric supply source while the roller 33 is always in contact with an insulating plate 35 when the vehicle is running on a straight track. However, when the vehicle enters a curve, there is relative displacement between the bogie frame 29 and the undercarriage 30. As a result, the roller 33 moves over either to contact plate 36 or 37 which plates are on either side of the insulating plate 35 and are connected to right and left electro-pneumatic valves respectively. In this manner one of the electro-pneumatic valves 19 depending upon whether the curve is left handed or right handed, is energized to open the valve for the passage of compressed air to the air delivery valve.

The contact post 31 can be adjusted in its position with the object of adjusting the position of the roller 33 in relation to the insulating plate 35. If the device is intended to start operating on smaller degree curves, then the contact post 31 which is adjustably mounted in the base 30 is moved towards the apex of the insulating plate 35. If, on the contrary, the device is intended to start functioning on larger degree curves, then the roller 33 is made to move towards the base of the insulating plate 35.

The path of movement of the rollers is an arc of a circle which has its center at the bogie pivot center 38, the radius being equal to the distance between bogie pivot center 38 and the contact post 31.

When the rollers move towards arrow A, electro magnetic valve 19 gets energized thus admitting compressed air from inlet pipe 40 connected to a source of compressed air supply into the delivery pipe 41 leading into the air delivery valve whereby the spray nozzle functions in the manner described above. The same performance will take place if the rollers move in the opposite direction depending upon whether the curve is right or left handed.

In place of the electro-pneumatic valve and the associated components, the supply of compressed air can be effected through a three-way cock 20 in which 42 shows the inlet which is connected to pipe 40. 43 and 44 are the two outlets, to one of which outlets, the said inlet 42 will communicate when spindle 55 is rotated. The spindle 55 is rotated by slotted levers 45 and 46 which are connected to each other by pin 47 and are actuated by relative displacement between the bogie frame 29 and the undercarriage 30. Lever 45 is hinged at its bottom end on pin 54 which is secured to the bogie frame. At its top the lever 45 is secured to undercarriage 30 through pin 39. The adjustability for degree of curvature at which the valve will start functioning is afforded by the pin 47 which can be moved up and down the slots 48 and 49 of the two levers 45 and 46.

When the pin 47 is moved in the direction of arrow Z, the degree of curvature at which the device will start operating is increased and vice-versa when the pin is moved in opposite direction.

In order to prevent spillage of the lubricant which is sprayed in atomized form at the root of the wheel flange, any excess oil is drained off by an oil drip tray 51, the outlet of which is located away from the wheel so that any possibility of the lubricant falling on the surface of the rail head or the tread of the wheel is eliminated.

Referring to FIG. 7, the spray nozzle assembly of FIG. 7 comprises a cylindrical body 61, a valve body 66 loaded by a spring 72, and an oil chamber 80 formed between two hollow bodies 53 and 62 connected by a stem 65. Around the valve body are fitted "O" rubber rings 67 to 71. At the ends of the body 61 are fitted caps 63 and 64 with stops 76 and 77 respectively. 73 and 74 are inlet pipes for supply of compressed air through pipe 52 while pipe 75 leads to the spray nozzle.

When the vehicle is running on a straight track, chamber 80 gets filled with oil. When the vehicle enters the curved track, compressed air is admitted through 74 to push valve body 66 resulting in the following sequence of operations:

a. when "O" ring 69 crosses port of pipe 78 the supply of oil is cut off but when "O" ring 71 crosses the port of pipe 75 then air is blown through pipe 75;

b. when "O" ring 70 crosses port of pipe 73 then the compressed air churns up the oil within the chamber 80 but when it crosses the port of pipe 75 oil under pressure starts ejecting through pipe 75 into nozzle 5. This continues till "O" ring 69 crosses pipe 73;

c. Finally, the valve body 66 comes to rest against stop limit 76 and in this position the supply of compressed air to pipe 75 is shut off with the result that the valve body 66 by the help of spring 72 returns to the

original position as shown and is ready for the next operation.

What is claimed is:

1. In a device to be mounted on a railway vehicle having flanged wheels, said device supplying lubricants to the flange of a track-engaging wheel thereof when the vehicle enters a curved track and comprising in combination a spray nozzle assembly, one fitted on the right and the other on the left hand side of the vehicle and including an oil chamber for storing a specific quantity of oil received from an oil reservoir; a spray nozzle; an oil delivery valve to control the supply of stored oil from the said oil chamber to the said spray nozzle and to also control the flow of oil from the oil reservoir to the said oil chamber, an air delivery valve means for supplying compressed air to the oil chamber to operate the said oil delivery valve and to spray the oil; control means provided for supplying compressed air, said control means being responsive to and actuable by the displacement caused between the bogie frame and the undercarriage of the vehicle, the arrangement being such that when the vehicle is traversing a straight track, the control means for supplying compressed air to the oil delivery valve is inoperative while the oil is allowed to flow into the said oil chamber of the spray nozzle assembly from the oil reservoir but when the vehicle enters a curve, compressed air supply control means causes compressed air to be released to the air delivery valve to actuate the said oil delivery valve, with the result that the oil stored in said oil chamber is released to

the spray nozzle and pneumatically sprayed in atomized form to the root of the wheel flange, the improvement in said combination comprising the provision of means for adjusting the control means for supplying the compressed air to the spray nozzle to function at various radii of curvature of the track, said means comprising an electro-pneumatic valve in the compressed air supply circuit wherein said valve fitted on the right or left of the vehicle is actuable by a pair of contact rollers mounted on a contact post which contact post is adjustably mounted on a base secured to the bogie frame, one contact roller being in contact always with a contact plate connected to one lead of current supply source, the other roller contacting one of a pair of contact plates separated by an insulation piece, each of the said two plates being electrically connected to either left or right electro-pneumatic valve, the insulation piece between the contact plates being of triangular shape so that the distance traversed by the roller between the two separated contact plates can be varied to permit the device to function at various radii of curvature of the track, the contact plates being mounted on an insulating base secured to the vehicle frame whereupon the movement of the base carrying the contact post and consequently the contact rollers in relation to the contact plates is caused by the relative displacement between the vehicle frame and the bogie when the vehicle enters the curved track.

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