Oct. 18, 1955 G. W. GARDNER ET AL 2,720,940

OILER FOR RAILROAD CAR JOURNAL BOXES

Filed March 13, 1953 4 Sheets-Sheet 1

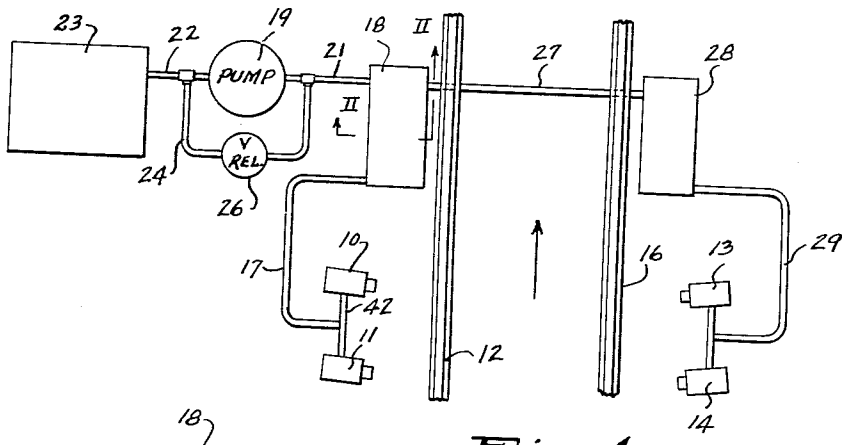


Fig. 1

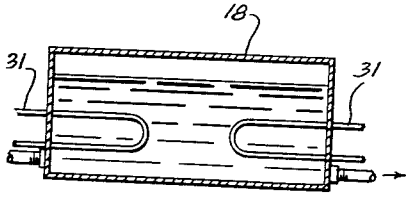


Fig. 2

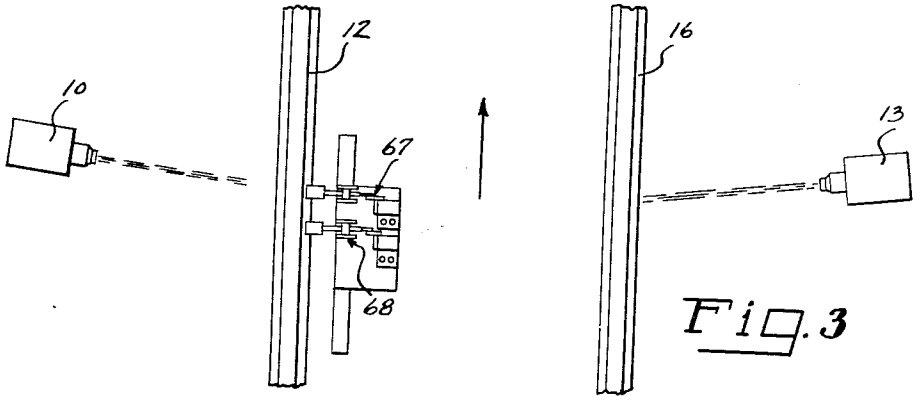


Fig. 3

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Filed March 13, 1953 4 Sheets-Sheet 2

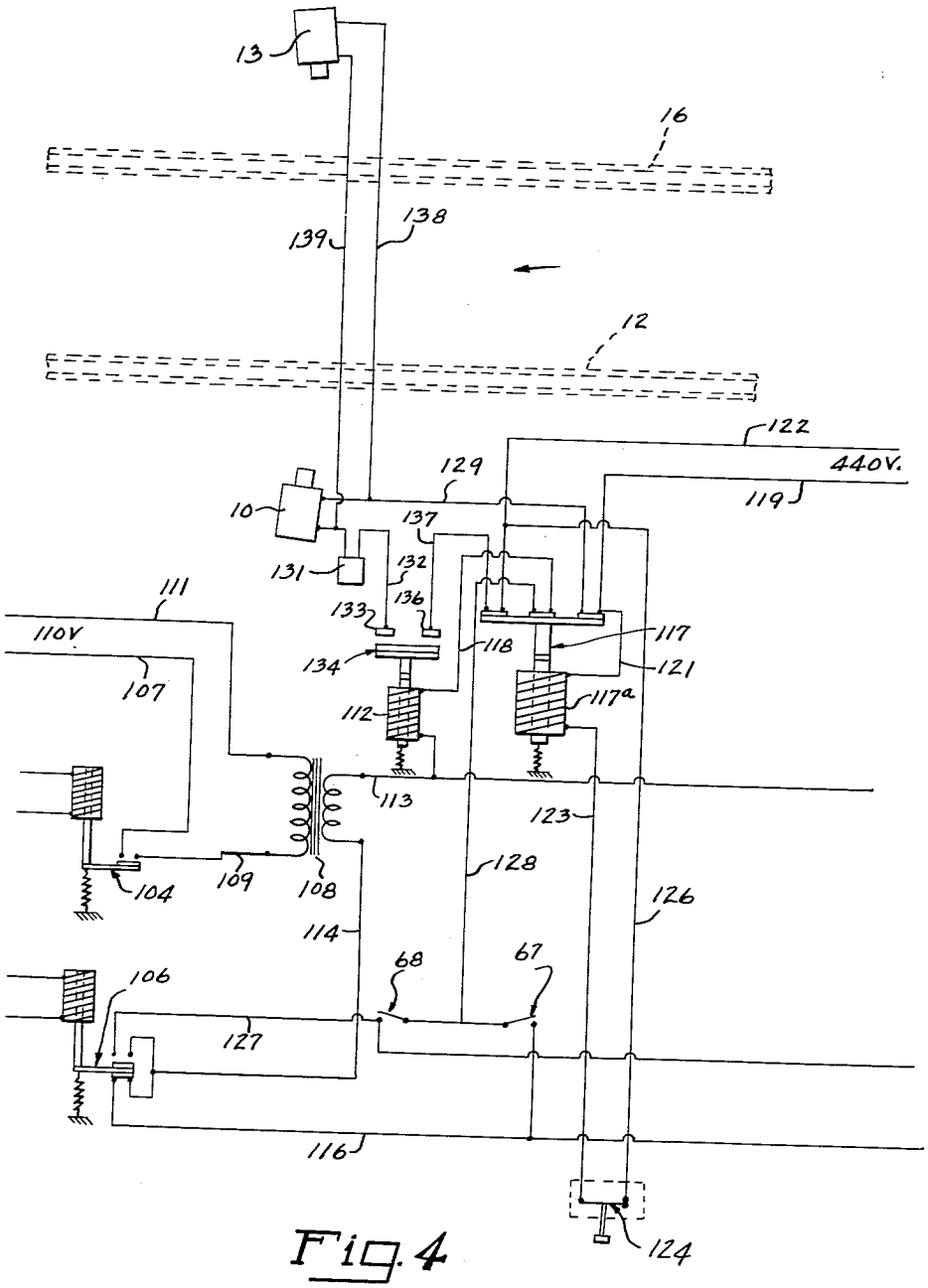


Fig. 4

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4 Sheets-Sheet 3

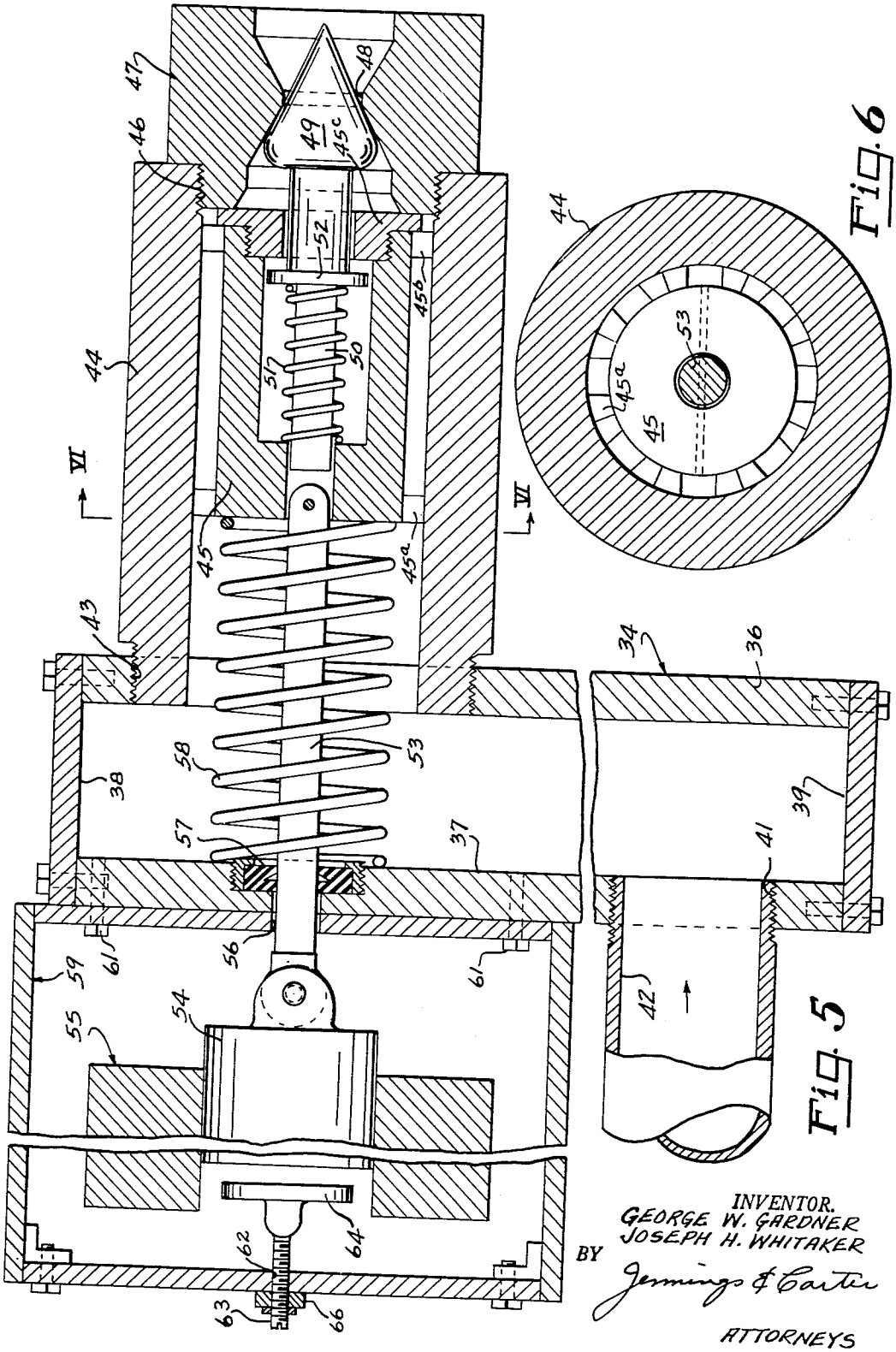


Fig. 6

Fig. 5

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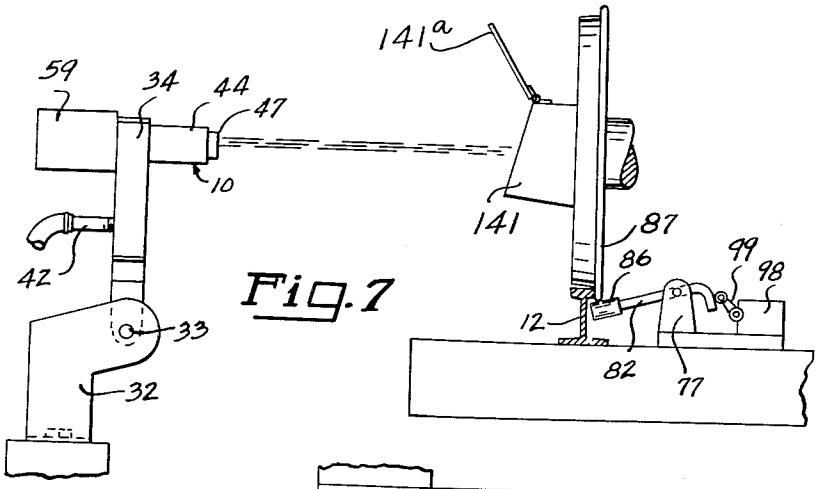


Fig. 7

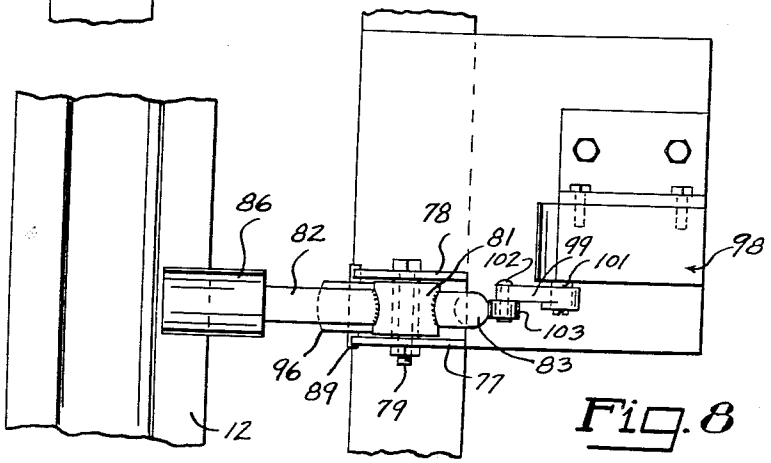


Fig. 8

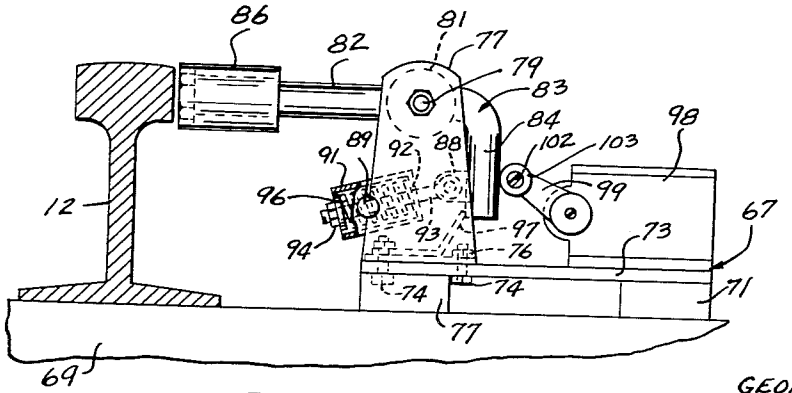


Fig. 9

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United States Patent Office

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OILER FOR RAILROAD CAR JOURNAL BOXES

George W. Gardner, Birmingham, and Joseph H. Whitaker, Warrior, Ala.

Application March 13, 1953, Serial No. 342,172

5 Claims. (Cl. 184—2)

This invention relates to apparatus for automatically injecting oil into the journal boxes of railway cars as the cars move along.

An object of our invention is to provide apparatus of the character designated in which provision is made for accommodating the actual oil injection to the passage of the journal boxes on the cars thus assuring that the oil stream enters the journal boxes while the cars are moving thereby within the usual speed limit of cars in a classification yard or the like.

Another object is to provide apparatus of the character designated in which the oil injecting mechanism is controlled selectively by a pair of track switches which are actuated by the wheels of the passing cars, and in which the one of said pair of switches which is effective at a given time to cause the apparatus to inject oil is in turn controlled by a train speed signal, thus energizing the apparatus at a time which automatically compensates for variations in speed of the cars, thereby assuring that the oil is injected into the journal boxes.

A more specific object of our invention is to provide oil injecting mechanism embodying a pair of solenoid actuated oil injector valves disposed alongside the railway track at the correct elevation to inject streams of oil into the journal boxes of the cars as they move along, the solenoids being energized selectively by track switches placed for sequential closing by the wheels of the cars as they move along.

Apparatus embodying features of our invention is illustrated in the accompanying drawings forming a part of this application, in which:

Fig. 1 is a diagrammatic plan view of the apparatus;

Fig. 2 is a sectional view taken along the line II—II of Fig. 1;

Fig. 3 is a plan view showing the track switches and the position of the oil injectors;

Fig. 4 is a diagrammatic wiring diagram;

Fig. 5 is an enlarged sectional view of one of the oil injectors;

Fig. 6 is a sectional view taken along the line VI—VI of Fig. 5;

Fig. 7 is a side elevational view showing the manner in which the oil injectors are mounted adjacent the railroad track;

Fig. 8 is a plan view of one of the track switches; and

Fig. 9 is a side elevational view of the track switch shown in Fig. 8.

Referring now to the drawings for a better understanding of our invention we show oil injectors **10** and **11** adjacent a rail **12** of the railroad track and oil injectors **13** and **14** adjacent the other rail **16** thereof. Oil is supplied to the injectors **10** and **11** by means of a conduit **17** which communicates with a tank **18**. The tank **18** is maintained under a pressure of from 15 to 25 pounds per square inch by means of a pressure pump **19** which is connected to the tank **18** by means of a conduit **21**. Communicating with the pump **19** through a conduit **22** is an oil storage tank **23**. Connected to the conduits **21** and

22 is a by-pass conduit **24** having a pressure regulating valve **26** therein which maintains the desired pressure within the tank **18**. Communicating with the tank **18** through a conduit **27** is a tank **28** which is positioned on the opposite side of the railroad track from tank **18** and supplies oil to the injectors **13** and **14** through a conduit **29**. The advantage in providing both tanks **18** and **28** is that a reservoir is positioned adjacent each set of injectors thus preventing undue loss of pressure which might result from the use of a single tank.

To assure that the oil flows freely through the conduits **17** and **29** to the oil injectors, the tanks **18** and **28** are provided with suitable heating means **31** which may be electrical heating elements of the immersion type.

Each of the oil injectors is pivotally mounted on a supporting bracket **32** by means of a pivot pin **33**. In view of the fact that the oil injectors **10**, **11**, **13** and **14** are all of the same construction, the description of only one is deemed necessary. Each injector comprises a hollow housing member **34** having a front wall **36**, a rear wall **37**, a top **38** and a bottom **39**. A threaded opening **41** is provided in the lower portion of the rear wall **37** for receiving the threaded end of a short supply conduit **42** which in turn communicates with the oil conduits **17** or **29** as the case may be. A threaded opening **43** is provided adjacent the upper end of the front wall **36** for receiving the threaded end of a cylinder **44**. The outer end of the cylinder **44** is threaded as at **46** for receiving the threaded end of a nozzle member **47** having an opening **48** therethrough for receiving a valve member **49**.

Positioned within the cylinder **44** is a sleeve **45** smaller in diameter than the inner diameter of the cylinder **44** but having projections **45***a* and **45***b* thereon bearing against the walls of the cylinder **44** whereby it is free to slide therein. The outer end of the cylinder **45** is closed by a cap **45***c*. The inner end of the sleeve **45** and the cap **45***c* are bored to form a passage for the stem **50** of the valve **49**. Surrounding the stem **50** is a compression spring **51** which bears against the end of the sleeve **45** and a collar **52** on the stem **50**. The cylinder **45** is connected by a link **53** to the armature **54** of the solenoid **55**. The spring **51** urges the outer end of the valve member **49** into engagement with the valve seat **48** in the nozzle **47** and cushions the seating of the valve member when the latter is closed as hereafter described. A suitable opening **56** is provided in the rear wall **37** for the passage of the link member **53** and a suitable oil seal **57** is provided to prevent leakage of oil around the link member. Surrounding the link member **53** between the rear wall **37** and the inner end of the sleeve **45** is a compression spring **58** which urges the armature **54**, the sleeve **45**, and with it the valve member **49** outwardly toward the valve seat **48**. The solenoid **55** is encased in a suitable housing **59** which is secured to the housing **34** by means of bolts **61**. Threaded through a drilled and tapped hole **62** in the rear of the housing **59**, is a stem **63** carrying on its forward end a stop **64** located adjacent the end of the armature **54**. A lock nut **66** is employed to hold the stop at adjusted positions relative to the end of the armature, thus determining the stroke of the armature and hence the degree of opening of the valve **49**.

Mounted adjacent one of the rails **12** or **16** are a pair of track switches **67** and **68** which actuate the solenoids **55** of the oil injectors in a manner to be described hereinafter. As shown in Fig. 9, the track switches **67** and **68** are mounted on a cross tie **69**. Suitable spacer blocks **71** are provided to position the switches at the desired elevation with respect to the rail **12**. The track switches **67** and **68** are spaced longitudinally from each other alongside the rail **12**.

In view of the fact that the switches **67** and **68** are identical in construction, the description of only switch **67**

will be given. The switch **67** comprises a base plate **73**. Mounted on the base **73** by means of bolts **74** having nuts **76** are a pair of upstanding brackets **77** and **78**. Mounted between the brackets **77** and **78** on a pivot pin **79** is a bushing member **81** which is preferably made of brass or similar material. Secured to the bushing **81**, by any suitable means such as by welding, is a horizontally extending arm **82**. Secured to the bushing **81** at a point diametrically opposite the arm **82** is an L-shaped arm **83** having a vertically extending portion **84**. Mounted at the outer end of the horizontally extending arm **82** is a cylindrical member **86** which is formed of brass or the like. As shown in Fig. 9 the cylindrical member **86** is positioned alongside the rail **12** in substantially the same horizontal plane as the upper surface of the rail, thus permitting the member **86** to be engaged by a wheel **87** of the railroad car as it moves along the rail. Secured to the L-shaped arm **83** adjacent the lower end thereof and extending inwardly between the brackets **77** and **78** is a bracket **88**. Pivotally mounted between the brackets **77** and **78** on a pivot pin **89** is a sleeve member **91** having a closed end wall **92** adjacent the bracket **88**. Pivotally connected to the bracket **88** and extending through a suitable opening in the end wall **92** is a rod **93**. The free end of the rod **93** is threaded for receiving a nut **94**. Surrounding the rod **93** between the end wall **92** and the nut **94** is a compression spring **96** which tends to urge the lower end of the L-shaped arm **83** inwardly between the brackets, thus holding the cylindrical member **86** in position to be engaged by the wheel **87** of the railroad car and also returns the arm **82** to a horizontal position after the wheel has passed. A stop member **97**, secured to the base **73** and extending upwardly between the brackets **77** and **78**, limits inward movement of the arm **83**.

Mounted on the base **73** adjacent the lower end of the L-shaped arm **83** is a switch box indicated generally at **98**. The switch mechanism is actuated by means of an arm member **99** which is rigidly secured to an arm **101** extending outwardly of the switch box. Mounted for rotation at the outer end of the arm **99** on a suitable pin **102** is a roller **103** which is in position to be engaged by the lower end of the L-shaped arm **83**.

Referring now to Fig. 4 of the drawing, we show the manner in which the track switches **67** and **68** actuate the solenoid actuated oil injectors **10** and **13**. While we show two pairs of oil injectors, namely **10** and **13** and **11** and **14**, only one pair is used at a time. The purpose of having two pairs is to assure that there is a pair in operation at all times.

It is customary to signal the desired speed of cars in classification yards, especially in hump yards where our invention is particularly applicable, by a series of lights. For instance, when a locomotive is to move a string of cars at a speed of two miles per hour one yellow light is shown and when a train is to proceed at four miles per hour a second yellow light is also shown. As shown in Fig. 4, the two miles per hour light controls a solenoid operated switch **104** and the second yellow light controls a solenoid operated switch **106**. Thus, when the two miles per hour signal light is shown, solenoid switch **104** is energized; when both the two and four miles per hour lights are shown, both switches **104** and **106** are energized.

The solenoid operated switch **104** connects one side **107** of a power supply to the primary of a transformer **108** through a wire **109**. The side **111** is connected directly to the transformer primary. The secondary of the transformer **108** is connected to a solenoid **112** through a wire **113** and to the track switch **67** through wires **114** and **116** with the switch **106** in the position shown. The solenoid **112** is connected to a three phase magnetic starter switch **117** through a wire **118**. Connecting the starter switch **117** and the track switch **67** is a wire **128**. The solenoid **117***a* for the switch **117** is connected to

one line **119** of a power source through a wire **121** and to the second line **122** of the power source through a wire **123**, a manually operated switch **124** and a wire **126**, thus making the apparatus inoperative until the manually operated switch **124** is closed.

The light controlled switch **106** is connected to the transformer **108** through the wire **114** and, when the switch **106** is closed, to one pole of the track switch **68** through a wire **127**. The other pole of the track switch **68** is connected to the starter switch **117** through the wire **128**.

One side of the solenoid **55** of the oil injector **10** is connected to one pole of the starter switch **117** through a wire **129** which in turn is connected to the power line **119**. The other side of the solenoid **55** is connected to a time delay relay **131** which in turn is connected through a wire **132** to one pole **133** of a switch **134** which is actuated by the solenoid **112**. The other pole **136** of the switch **134** is connected through a wire **137** to a pole of the starter switch **117** which is connected to the power line **122** when the starter switch is closed, thus completing the circuit to the solenoid **55** when both the starter switch **117** and the solenoid **112** are energized. The solenoid of the injector **13** on the opposite side of the track is wired for simultaneous operation with the unit **10** through wires **138** and **139** connected as shown.

The time delay relay **131** employed may be a 440 volt time delay relay embodying two normally open contacts with the center gang omitted and having a special 440 volt operating coil, as disclosed in Bulletin 7305 of the Clark Controller Company. We have found in actual practice that such a relay is satisfactory in every respect.

From the foregoing description the operation of our improved mechanism will be readily understood. With the light controlled switch **104** closed, the cars are moved at a speed of two miles per hour. The wheels **87** of each railroad can close the track switch **67**. As they pass thus completing the circuit to the solenoid **112** through conductors **128**, **118**, **113**, **114**, and **116**, thus closing the switch **134**. With the switch **134** closed, the circuit is complete between the oil injectors **10** and **13** and the starter switch **117** through the time delay relay **131** and leads **132**, **137** and **129**. The track switch **67** is positioned adjacent the track **12** so that when it is actuated, the oil injection occurs at the proper time for the oil to enter a journal box **141**, with the lid **141***a* open as shown, as the same moves past at two miles per hour, thus accommodating the oil injection to the speed of the moving cars.

With both light switches **104** and **106** closed, the cars are moved at four miles per hour. Under this condition the connection between conductors **114** and **116** is broken thus breaking the connection to switch **67** and connecting wire **114** to lead **127**. As the wheel **87** closes the switch **68**, the circuit is complete to solenoid **112** through conductors **128**, **118**, **113**, **114** and **127**, thus closing the switch **134** and actuating the solenoid **55** through the relay **131**. The switch **68** is so positioned adjacent the rail **12** that when it is actuated, the oil injection occurs at the proper time for the oil to enter the journal box as the same moves past at four miles per hour.

The time delay relay **131** causes the oil injection valve to remain open until the required quantity of oil is injected into the journal box. Also, the relay **131** breaks the circuit to the solenoid **55** in the event a wheel of the railroad car should stop on one of the track switches **67** or **68**. The solenoid **55** is thus energized only for a predetermined length of time due to the fact that the relay must be released and actuated again before it would again energize the solenoid **55**. In actual practice we permit the valve **49** to remain open for about $\frac{3}{16}$ of a second during which time approximately four ounces of oil are injected into the journal box.

From the foregoing it will be seen that we have devised improved mechanism for automatically oiling journal boxes of railway cars as the cars move along in a classi-

fication yard. By providing means for accommodating the actual oil injection to the speed of the moving cars, all of the oil enters the journal boxes, thus eliminating waste. Furthermore, our improved mechanism is now in regular operation in the classification yard of a major railroad company and has proved to be satisfactory in every respect.

While we have shown our invention in but one form it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and we desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What we claim is:

1. In apparatus for oiling railway car journal boxes as the car moves along a track, a solenoid operated oil injector valve mounted alongside the track and operable to inject precise quantities of oil into the journal boxes as said journal boxes pass said valve, at least one track switch mounted adjacent the track in connection with said injector valve and actuating the same upon engagement of said switch with a wheel of the car, means holding said valve open until said quantities of oil are injected into the journal boxes, means closing said valve after the track switch remains closed for a predetermined time, and means supplying oil under pressure to said injector valve.

2. In apparatus for oiling railway car journal boxes as the car moves along a track, a solenoid operated oil injector valve mounted alongside the track and operable to inject precise quantities of oil into the journal boxes as said journal boxes pass said valve, track switches operatively connected to said oil injector valve and spaced longitudinally alongside at least one rail of the track a distance to accommodate the oil injection to variations in the speed of the moving car, whereby said quantities of oil are injected into said journal boxes upon engagement of said track switches with a wheel of the car, means holding said injector valve open until said quantities of oil are injected into the journal boxes, means closing said injector valve after said track switches remain closed for a predetermined time, and means supplying oil under pressure to said oil injector valve.

3. In apparatus for oiling railway car journal boxes as the car moves along a track, an oil injector valve housing mounted alongside the track, there being an oil inlet in said housing, a cylindrical member mounted on and communicating at its inner end with said housing, a nozzle mounted at the outer end of said cylindrical member, a valve seat in said nozzle, a valve member in said cylindrical member and engageable with said valve seat, an electrically operated solenoid mounted on said valve housing, means operatively connecting said valve member to the armature of said solenoid, resilient means urging said valve member toward said valve seat when the solenoid is de-energized, track switches operatively connected to said solenoid and spaced longitudinally alongside at least one rail of the track a distance to accommodate the oil injection to variations in the speed of the moving car, whereby precise quantities of oil are injected into said journal boxes upon engagement of said track switches with a wheel of the car, and means supplying oil under pressure to said oil inlet.

4. In apparatus for oiling railway car journal boxes as

the car moves along a track, track switches mounted alongside at least one rail of the track and spaced apart alongside the rail, a solenoid operated oil injector valve mounted alongside the track in position to inject oil into the journal boxes and comprising a hollow housing having an oil inlet therein, a cylindrical member mounted on and communicating at its inner end with said housing, a nozzle mounted at the outer end of said cylindrical member, a valve seat in said nozzle, a valve member in said cylindrical member and engageable with said valve seat, an electrically operated solenoid mounted on said housing, means operatively connecting said valve member to the armature of said solenoid, resilient means urging said valve member toward said valve seat when the solenoid is de-energized comprising a sleeve member having a closed inner end and fitting in the cylindrical member, spaced projections on said sleeve member slidably engaging said cylindrical member, a cap for the outer end of said sleeve member having a centrally disposed opening therethrough, a stem on said valve member extending inwardly through the opening in said cap, there being an opening in the inner end of said sleeve member for receiving the inner end of said stem, a compression spring within said sleeve member and surrounding said stem, a spring abutment on said stem adjacent the inner side of said cap, a link connecting said sleeve member to the armature of the solenoid, there being an opening in the rear wall of said housing for slidably receiving said link, a compression spring surrounding said link intermediate said sleeve member and said rear wall of the housing, means operatively connecting said track switches to said oil injector valve whereby a quantity of oil is injected into said journal boxes upon engagement of said track switches with a wheel of the car, and means supplying oil under pressure to said injector valve.

5. In apparatus for oiling railway car journal boxes as the car moves along a track, a solenoid operated oil injector valve mounted alongside the track in position to inject precise quantities of oil into the journal boxes, means supplying oil under pressure to said oil injector valve, track switches mounted alongside at least one rail of the track and spaced apart alongside the rail to accommodate the oil injection to variations in the speed of the moving car, a pair of wires supplying power to said solenoid operated oil injector valve, a time delay relay in circuit with one of said wires holding said valve open until said quantities of oil are injected into the journal boxes and breaking the circuit to said valve after said track switches remain closed for a predetermined time, a switch in the circuit supplying power to the injector valve, and means in circuit with said track switches adapted to close the switch which is in the circuit supplying power to the injector valve when one of said track switches is closed.

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