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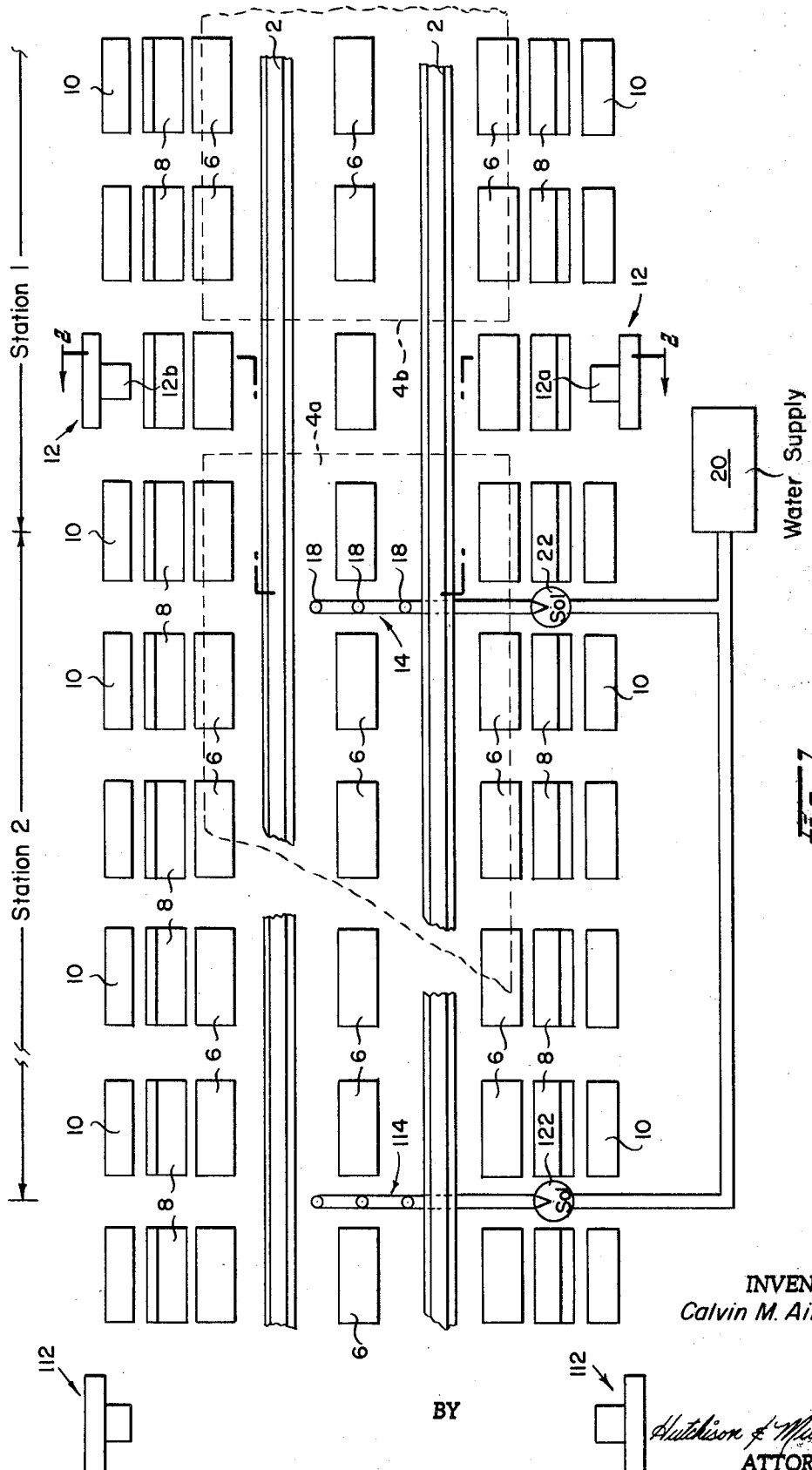
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RAILWAY CAR THAWING SYSTEM

Filed Sept. 5, 1968

2 Sheets-Sheet 1



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Fig. 2

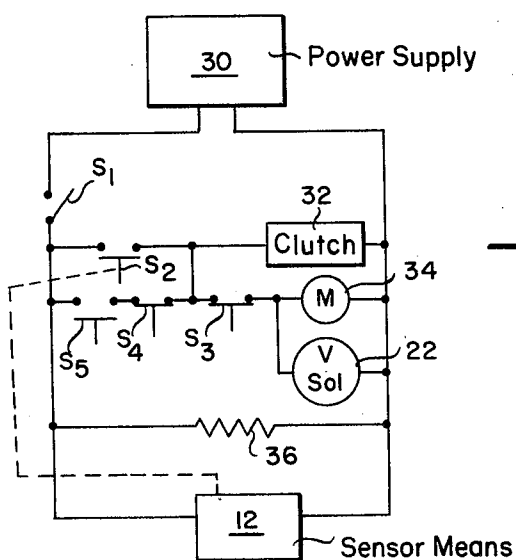
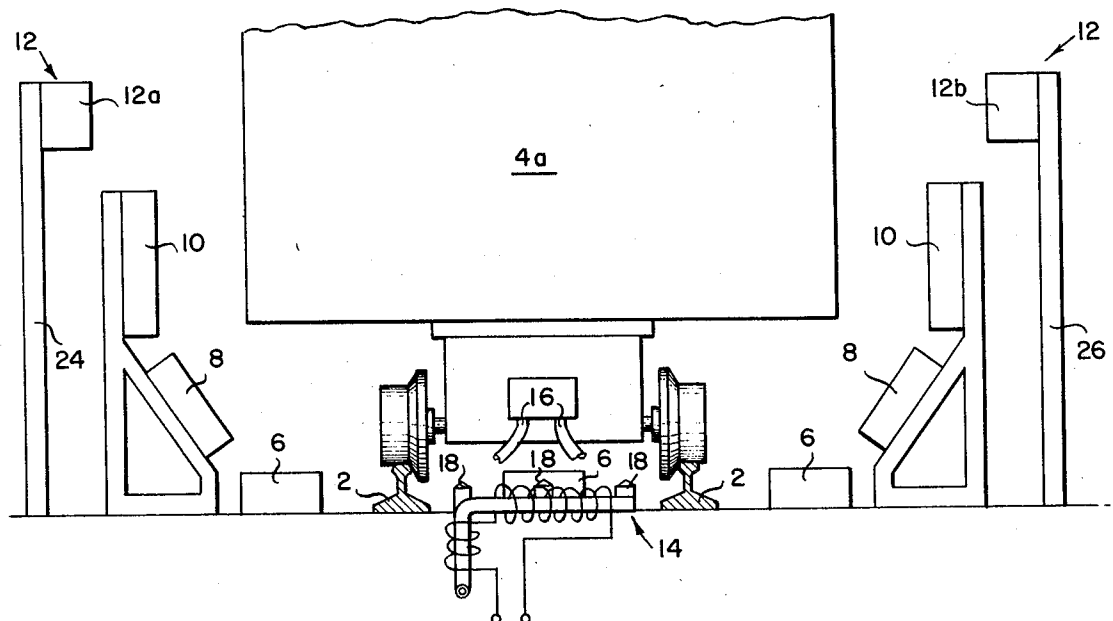


Fig. 3

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RAILWAY CAR THAWING SYSTEM

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9 Claims

ABSTRACT OF THE DISCLOSURE

A railway ore car thawing system of the type including roadbed mounted electric heater means for heating the lower discharge portions of the cars, characterized by the provision of normally deactivated spray means for spraying cooling water on the brake hose connections between each pair of cars, and stationary sensor means responsive to the opening between a pair of cars for actuating said spray means.

SPECIFICATION

It has been proposed in the patented prior art to provide roadbed-mounted heater means for thawing the lower portions of railway ore cars and the like to permit the discharge of goods therefrom. One major drawback to the known thawing systems is the likelihood of damage to the flexible pneumatic brake hoses and couplings that extend between the cars. Since the air hoses are subjected to the same heat as the undersides of a frozen car, the heat on the unprotected rubber hoses and air seals causes deterioration and failure, resulting in costly repair or replacement. One proposed solution has been to place a heat shield around the hoses and connections, but this involves costly labor. The present invention was developed to provide a practical inexpensive solution to the problem of protecting the hoses from damage during thawing of the car.

The primary object of the present invention is to provide an improved ore car thawing system including normally-inactive roadbed mounted spray means adjacent the downtrack end of a thawing station, and sensor means responsive to an opening between a pair of cars for activating said spray means.

A further object of the present invention is to provide timer means operable by said sensor means to positively limit the period during which cooling water is sprayed on the hoses, whereby the spray means will be automatically cut off even if the ore car train were to be stopped in a position in which the opening between a pair of cars is directly opposite the sensor means. According to another object of this invention, holding circuit means are provided for by-passing the sensor-operated switch to temporarily energize clutch means associated with the timer motor, whereby the spray means may be caused to operate for a given period of time following the passage of the opening past said sensor means.

Other objects and advantages of the invention will become apparent from a study of the following specification when considered in conjunction with the accompanying drawing, in which:

FIG. 1 is a plan view of the ore car thawing system including the hose cooling spray means of the present invention;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1; and

FIG. 3 is a schematic diagram of the electrical system for actuating the cooling spray means.

Referring first to FIGS. 1 and 2, the conventional ore car thawing system includes a plurality of heating stations arranged in succession along the track 2 for heating

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the lower discharge portions of a train of ore cars 4. Each heating station includes a plurality of bottom, oblique and side electric heater means 6, 8 and 10, respectively. Mounted on the roadbed adjacent the down-track end of each station are stationary sensor means 12 operable to detect the opening between a pair of successive cars, and normally deactivated spray means 14 operable by said sensor means to spray cooling liquid upwardly upon the brake hose connections 16 between a pair of cars. Each of the spray means includes a plurality of upwardly directed spray nozzles 18 mounted on the railroad bed between the tracks 2 and supplied with cooling water from source 20 via normally-closed solenoid valve means 22.

In the illustrated embodiment, the sensor means 12 are of the photoelectric type including a light source 12a mounted on a column 24 on one side of the track, and a photoelectric cell mounted on another column 26 on the opposite side of the track, whereby the sensor means are operable upon the passage of light through the space between each successive pair of said cars. As shown in FIG. 1, the sprays means 14 may be arranged a given distance downtrack from the sensing means 12, whereby the system may be operated to cool the hose connections of a slowly traveling train of ore cars.

Referring now to the electrical diagram of FIG. 3, the light source 12a of the sensor means is energized from the 120-volt, 60-cycle supply 30 via a main switch S₁, said sensor means being operable to close a normally-open sensor switch S₂. Closure of switch S₂ effects direct energization of timer motor clutch 32, and energization of the timer motor 34 and solenoid valve 22 via normally-closed first timer motor switch S₃. Upon energization of motor 34, switch S₅ is closed to define a holding circuit for clutch 32 via the normally closed second timer motor switch S₄. Following a given period of time, timer motor operated switches S₃ and S₄ are opened to deenergize the solenoid valve and the timer motor, whereby the electrical system automatically becomes de-activated even though the train might be stopped in a position in which the opening between a pair of cars exposes the light source to the photocell pickup means. The heater means 36 connected across the power supply lines is wrapped around the spray means and water supply pipes to prevent freezing of the spray water, as shown schematically in FIG. 2.

OPERATION

Assume that the thawing of ore car 4b at Station 1 has been completed, and that the train is being slowly advanced in the direction shown by the arrow to remove car 4a from Station 2 and to move car 4b from Station 1 to Station 2. When the opening between the cars is opposite the sensor means 12, the sensor is activated to close switch S₂ to energize timer motor 34 and solenoid valve 22 via the first timer motor switch S₃, and to directly energize the clutch 32. The spray means is now activated to spray cooling water upwardly on the hose connections passing thereabove, and switch S₅ is closed to establish the holding circuit for the timer motor and clutch.

Following a given period of time, timer motor operated switch S₄ opens to deenergize the holding circuit for clutch 32, motor 34 and solenoid valve 22. Assuming that by this time the sensor light beam has been broken by car 4b and that switch S₂ is thereby opened, the clutch, motor and solenoid valve are deenergized. However, in order to positively assure deenergization of the timer motor and solenoid valve in the event that the train should be stopped in a position in which a car opening is opposite the sensing means (whereby switch S₂ remains closed), the timer operated switch S₃ is opened after a given in-

terval to break the path to the motor and the solenoid valve.

Although the sensor means has been illustrated and described as being of the photoelectric type, it is apparent that sonic, infrared or other types of sensing systems could be utilized equally as well. Furthermore, while the spray means 114 associated with the downtrack end of the second station is normally operable by its own sensing means 112, it is possible that under certain instances (for example, when all the ore cars have the same length), it might be desirable to operate all the spray means by a single sensing means.

While in accordance with the provisions of the patent statutes the preferred forms and embodiments of the invention have been illustrated and described, it will be apparent to those skilled in the art that various changes may be made without deviating from the invention set forth in the following claims.

What is claimed is:

1. In a railway car thawing system including stationary heater means mounted on the railroad track bed for heating the lower discharge portions of ore cars and the like, the improvement which comprises

normally deactivated spray means mounted on the track bed for spraying cooling water on the hose connections between a pair of cars;

and means for activating said spray means, comprising stationary sensor means mounted on said track bed and responsive to the opening between said pair of cars.

2. Apparatus as defined in claim 1, and further including timer means for deactivating said spray means after a given period of time.

3. Apparatus as defined in claim 2, wherein said spray means includes spray nozzle means mounted on the track bed for spraying cooling water upwardly on the hose connections, a source of cooling water, and normally deenergized solenoid valve means operable, when energized, to connect said source with said nozzle means.

4. Apparatus as defined in claim 3, wherein said spray activating means comprises a voltage source, and means including a normally-open sensor-operated switch (S₂)

and a normally closed first timer-motor switch (S₃) for energizing said solenoid valve means.

5. Apparatus as defined in claim 4, wherein said timer means includes timer motor means connected in parallel with said solenoid valve means, said timer motor means being operable to open said first timer motor switch after a given period of time.

6. Apparatus as defined in claim 5, and further including a normally closed second timer motor switch (S₄), and a normally-open clutch switch (S₅), said last named two switches being connected in series across said sensor-operated switch.

7. Apparatus as defined in claim 6, wherein said timer means includes a clutch connected in parallel across the network branch including said first timer motor switch (S₃) connected in series with the motor-solenoid valve branch.

8. Apparatus as defined in claim 1, wherein said spray means is spaced a given distance down track from said sensor means, whereby said hose connections may be cooled by said spray means during transport of a train of said ore cars.

9. The method of thawing the lower portions of railway cars connected in a train and having pneumatic hose connections extending between the cars, which comprises the steps of

heating the lower portions of a car at a heating station; displacing the car from said heating station; detecting the opening between the car and the proceeding car during movement from said heating station; and spraying cooling liquid into said opening to cool said hose connections.

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