Aug. 2, 1966 L. C. SIMMONS 3,264,472

TRACK RAIL SNOW AND ICE MELTER

Filed Sept. 11, 1962 2 Sheets-Sheet 1

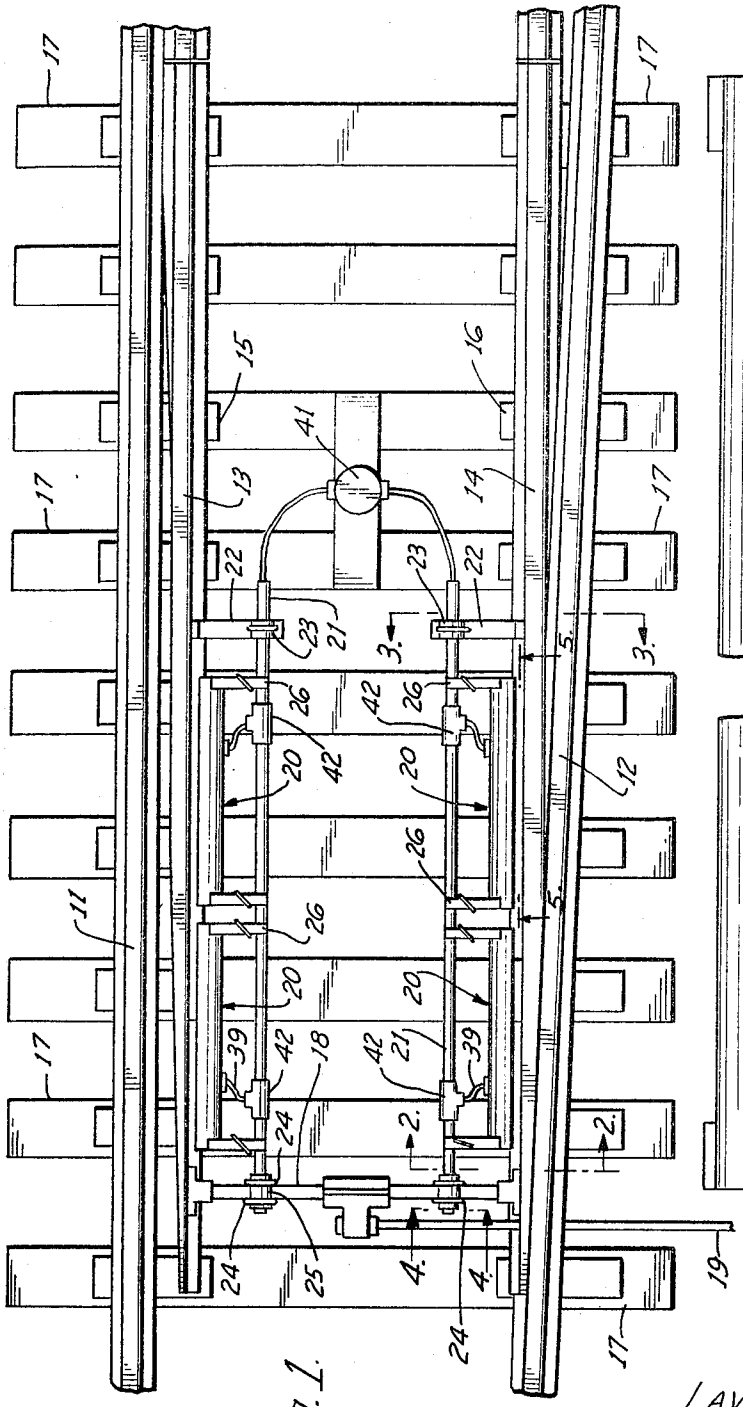


Fig. 1.

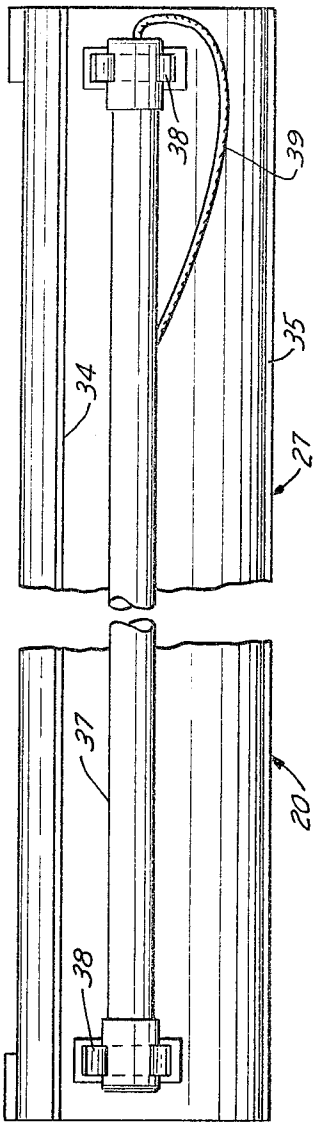


Fig. 5.

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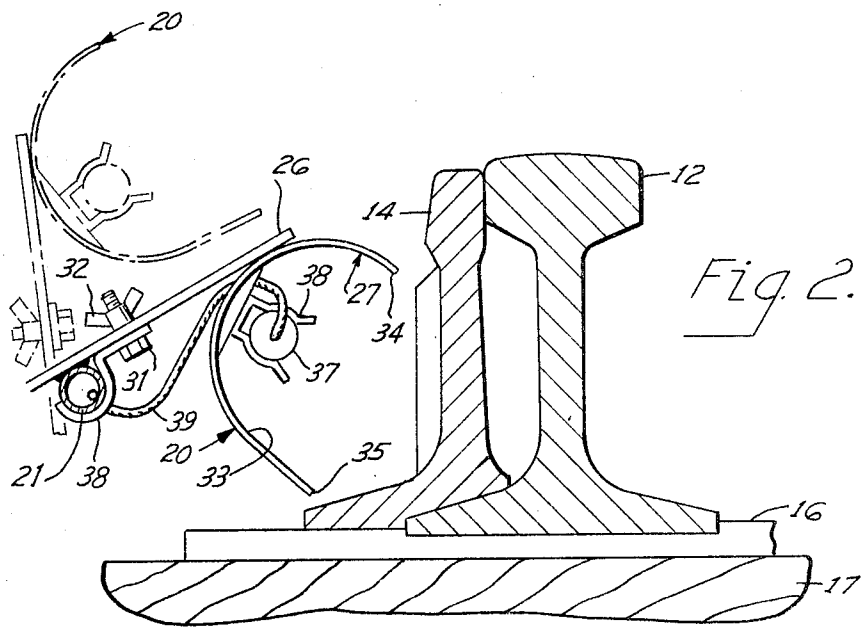


Fig. 2.

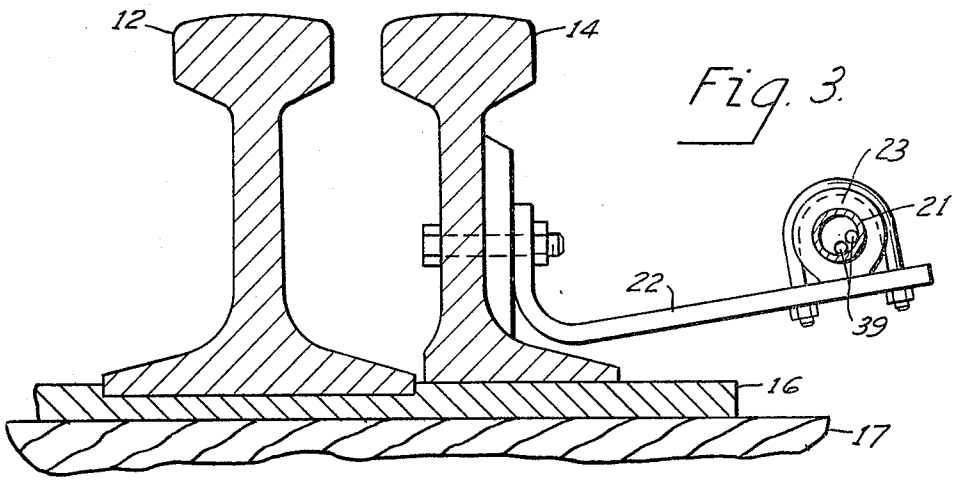


Fig. 3.

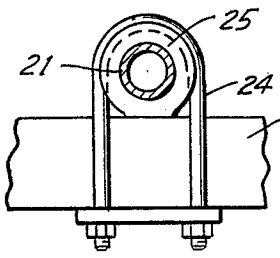


Fig. 4.

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TRACK RAIL SNOW AND ICE MELTER

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6 Claims. (Cl. 246—428)

This invention relates to apparatus for heating railway rails, and more particularly to apparatus for heating such rails to prevent the accumulation of ice and snow at rail switches or the like.

The operation of a railway switch can be impeded if snow or ice accumulates between the fixed or stock rail and the movable rail or switch point in sufficient quantity to prevent the movable switch point from properly engaging the stock rail during operation of the switch. In general, there are two conditions under which snow or ice can cause trouble in operation of switches. One condition can result when snow resulting from heavy snowfall or drifts packs between the switch point and the stock rail in sufficient quantity to prevent proper engagement of the switch point and the stock rail. The second condition arises when water freezes and forms ice around or on the movable switch point in such manner as to prevent proper engagement of the rails.

Consequently, if the switch is to operate properly at all times during snowy or freezing weather, it is necessary that means be provided for preventing the accumulation between the stock rail and the switch point of snow and ice which could impede proper operation.

Heretofore, it has been the usual practice to mount a conduction type of electric heater under the rail head on the gauge side or inside of the stock rail. The heater so located has been advantageous for melting any snow tending to accumulate between the stock rail and the switch point. However, such a heater is poorly located to keep ice from forming on the switch point, since the switch point is unheated when not in contact with the stock rail. Such an arrangement is also disadvantageous because a switch point of special shape is required to clear the heater, and because it is difficult and costly to perform maintenance work on a heater which is so located between the switch point and stock rail. For example, special care must be taken to prevent inadvertent closing of the switch could cause damage to tools or injury to workmen during maintenance work on the heater.

For best results, the apparatus for heating the switch to prevent widespread accumulation of snow or ice should satisfy several requirements. It should not require any special switch fittings or switch points, and should be capable of being fitted to any existing standard switch. The heat should be applied to the switch point so the heated switch point can prevent the accumulation of snow between the switch point and the stock rail, and can prevent ice from forming on the switch point. The apparatus preferably should be such that it can be electrically insulated from the rail, whereas the conduction type of heater ordinarily used must be electrically connected to the rail. The apparatus should work equally well whether the switch is open or closed. It should not interfere with or be damaged by the wheels of the locomotives or cars. The apparatus should not extend into the central portion between the rails where it can be struck or damaged by disconnected and hanging steam or air hoses. The apparatus should be low in cost, easy to install, and require little maintenance; whatever maintenance is required should be easily performed. The apparatus should be inexpensive to operate. Furthermore, it is preferable that the apparatus be such that its length can be readily changed to permit the full length or any part of length of the switch point to be heated.

The prior devices, including those described above as usually employed, fail to meet these requirements in several respects.

It is an object of this invention to provide apparatus satisfying the above requirements and avoiding the deficiencies of prior apparatus. It is a further object of this invention to provide heating apparatus which is mounted upon and movable with the switch points to heat them to prevent accumulation of snow and ice. A further object is the provision of such apparatus which can be manufactured and installed at low cost and which requires minimal maintenance.

These and other objects of the invention will be apparent from the following description of a preferred embodiment thereof in connection with the attached drawings in which:

FIGURE 1 is a plan view of a railroad track switch, each of the two movable switch points of which carries heating apparatus embodying the invention;

FIGURE 2 is a cross section, along line 2—2 of FIGURE 1 but to larger scale, showing the reflector and source of heat;

FIGURE 3 is a section along line 3—3 of FIGURE 1 but to a larger scale, showing how one end of the heating apparatus of the invention is mounted on a switch point;

FIGURE 4 is an elevation from line 5—5 of FIGURE 1, to a larger scale, showing how the other end of the heating apparatus is carried by the switch point; and

FIGURE 5 is an elevation from line 4—4 of FIGURE 1 but to a larger scale, showing the reflector and heating element located therein.

FIGURE 1 of the accompanying drawing shows in somewhat simplified form a typical railway switch installation including the usual stationary stock rails **11** and **12** that have movable switch points **13** and **14** associated therewith. In the usual manner switch points **13** and **14** are adapted to slide on the slide plates **15** and **16** at the sides of the switch, these slide plates being secured to the upper surface of the ties **17** in the usual manner. As indicated in FIGURE 1, the switch points **13** and **14** are interconnected at the throw end of the switch by a head rod **18**, which is connected in the usual fashion to a throw rod **19**, actuated.

Each of switch points **13** and **14** carries heating apparatus **20** embodying the invention, one of which is shown to an enlarged scale in FIGURES 2, 3 and 5, as mounted on switch point **14**.

Each illustrated heating apparatus comprises an elongated supporting member **21**, taking the form of a pipe in the illustrated embodiment, supported from the associated switch point at a position substantially midway of the height bewteen the bottom and the top of the switch point, and spaced from and substantially parallel to the inner or gauge side of the switch point. This supporting member is fixed at its end remote from the throw end of the switch to a bracket **22** which is mounted on the switch point through an existing bolt hole, a shock absorbing member, such as a rubber grommet **23** of conventional construction being preferably provided; at its other end near the throw end of the switch the supporting member **21** is clamped by a pair of U-shaped brackets **24** to head rod **18**, a shock absorbing member such as a rubber grommet **25** of conventional construction being provided between the member **21** and head rod **18**, as shown in FIGURE 4.

Clamped to pipe **21** are several brackets **26** which support an elongated reflector member **27**. As shown in FIGURE 2, each of the brackets **26** has a clamping portion **28**, fixed by bolt **31** and thumb nut **32** to the bracket **26**, so that by suitable loosening and tightening of the nuts **32** the brackets **26** can be positioned in any one

of numerous angular positions around the axis of the pipe **21**.

The elongated reflector member **27**, of which one or more may be mounted along each pipe **21**, has a generally concave side **33** which is adapted to reflect infrared radiation, the cross section of the reflector being such that the reflector has two marginal edges **34** and **35** which are generally parallel and spaced apart by a distance almost as great as the height of the switch point. Normally these marginal edges closely approach the switch point. Preferably the concave side of the reflector is of such shape that an elongated infrared radiation source **37** disposed longitudinally of the reflector in concave side of the reflector emits infrared radiation the direct and reflected portions of which heat substantially the entire portion of the switch point rail lying between the marginal edges **35** and **36** of the reflector **27**.

The radiation source illustrated is a conventional tubular type infrared lamp, the ends of which are supported by and eletcrically connected to conventional electrical tube brackets **38** fixed to and projecting from the concave surface **34** of the reflector **27**.

Preferably, as is illustrated, elecrtical wires **39** supplying electrical energy for the lamp **37** pass through the pipe **21**, to an outlet **41** of an underground conduit, not shown, containing an electrical power cable.

If, as is shown in FIGURE 1, there are two or more reflectors **27** each having an infrared lamp **37** therein, mounted on a single pipe **21**, the pipe **21** may be provided with one or more conventional T joints **42** intermediate its ends to permit the electric power supply wires **39** to pass to the lamps from the interior of the pipe **21**.

The parts are preferably so located and shaped that, as shown in FIGURE 2, the marginal edges **35** and **36** of the reflector **27** are located in sufficiently close proximity to the inner or gauge side of the associated switch point rail to direct the radiation toward the switch point, to prevent debris from striking and breaking the lamps, to keep the reflector clean, to decrease heat loss by convection and radiation from the switch point, and to reduce emanation of light from the installation which could be annoying to engine crews.

Furthermore, the design is such that, as also shown in FIGURE 2, the portion of the apparatus including the reflector **27**, the lamp **37**, the electrical wires **39**, and the brackets **26** supporting the reflector can be swung upwardly, as shown in broken lines, to a position away from the associated switch point, for maintenance purposes. This can be done merely by loosening the nuts **32** holding the clamping portions **28** of the brackets **26** supporting the reflector, and swinging the reflector upwardly to a desired upper position and temporarily tightening the nuts to lock the assembly in such position. When in this position the reflector and lamps can be readily inspected and cleaned if desired, or the lamps can be replaced. It is not necessary for the switch point to be moved away from the stock rail, and in any event it is not necessary for any tools or the workman's hands to be put into the space between the stock rail and the switch point. Thereafter the nuts **32** can be loosened, the reflector and lamp swung back into operative position, and the nuts tightened to lock the assembly in operating position.

It is apparent that in the illustrated embodiment when the reflector and its associated parts are swung upwardly for maintenance purposes, there is no problem of breakage or entangling of wires, since they are located inside the tubular member **21** substantially along the axis about which the parts are pivotally moved. The major portions of the lengths of the wires are thus at all times protected by the member **21**.

Various other sources of infrared radiation may be used, rather than the infrared lamps disclosed. For example, such sources may be quartz tubes or metal rod heaters, or even gas infrared heaters. In any case, the energizing fluid, whether it be elctricity or gas, can be carried by, and preferably within, the elongated supporting member **21**. Furthermore, it is apparent that in the apparatus of the present invention the infrared elements can be mounted close to the rails to provide increased heating efficiency, since the radiant energy per unit of radiated area varies inversely as the square of the distance the rays travel.

The shock protective members **23** and **25**, as well as the light weight of the parts carried thereby, protect from damage the reflector **27** and lamp **37** from shocks imparted to the switch from locomotives and cars traveling over the switch. Each reflector **27** is located below the bottom of the wheel flanges so it cannot be damaged by the wheels. No portion of the heating apparatus is located in the central portion of the track where it may be struck by hanging disconnected steam or air hoses. No special switch fittings are required, since the apparatus may be mounted on existing rails in standard switches. The apparatus can be electrically insulated from the rail. The radiation is directed toward the switch point to be heated, so that the accumulation of snow or the formation of ice is prevented at locations where it could prevent engagement of the switch point with the stock rail. Furthermore, the heating is efficient since only the part requiring heat is heated by the infrared radiation and there is little danger of burning any combustible materials or exposing employees to injury. The power cost for heating is low.

Advantages and modifications other than those indicated above will be apparent to those skilled in the art. It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty reside in the invention.

I claim:

1. In a railroad switch installation having an elongated stationary stock rail and an elongated switch point movably mounted so that it may be moved toward and away from said stock rail, the combination of an elongated supporting member extending longitudinally of and in spaced relation to the switch point on the side thereof opposite the stock rail, means for supporting said elongated supporting member from said switch point for movement therewith, an elongated reflector having a concave surface capable of reflecting infrared radiation and two spaced marginal edges, said reflector being carried by said elongated supporting member with its concave surface facing said switch point and its marginal edges in close proximity to the side of said switch point opposite said stock rail, elongated infrared radiation producing means disposed at the concave side of said reflector to generate radiation which is reflected onto and heats said switch point, means for supplying energy to the said radiation source carried by said elongated supporting member, and means pivotally mounting said reflector on said elongated supporting member so that it may be swung upwardly away from said switch point to permit access to the concave side of said reflector and to said radiation producing means.

2. In a railroad switch installation having an elongated stationary stock rail and an elongated switch point movably mounted so that it may be moved toward and away from said stock rail, the combination of an elongated supporting member extending longitudinally of and in spaced relation to the switch point on the side thereof opposite the stock rail, means for supporting said elongated supporting member from said switch point for movement therewith, an elongated reflector having a concave surface capable of reflecting infrared radiation and two spaced marginal edges, said reflector being carried by said elongated supporting member with its concave surface facing said switch point and its marginal edges in close proximity to the side of said switch point opposite said stock rail, an elongated infrared radiation producing means disposed at the concave side of said re-

flector to generate radiation which is reflected onto and heats said switch point, and means for supplying energy to the said radiation producing means carried by said elongated supporting member, said means supporting said elongated supporting member protecting said reflector and said radiation producing means against shocks imparted to the switch point.

3. In a railroad switch installation having an elongated stationary stock rail, an elongated switch point movably mounted so that it may be moved toward and away from said stock rail and a head rod connected to and extending transversely of the switch point at its throw end, the combination of an elongated supporting member extending longitudinally of and in spaced relation to the switch point on the side thereof opposite the stock rail, means for supporting said elongated supporting member at one end thereof from said head rod and from the other end thereof from said switch point so said elongated supporting member moves with said switch point, an elongated reflector having a concave radiation-reflecting surface capable of reflecting infrared radiation and two spaced marginal edges, said reflector being carried by said elongated supporting member with its concave surface facing said switch point and its marginal edges in close proximity to the side of said switch point opposite said stock rail, an elongated infrared radiation-producing means disposed at the concave side of said reflector to generate radiation which is reflected onto and heats said switch point, means for supplying energy to said radiation producing means carried by said elongated supporting member, and means pivotally mounting said reflector on said elongated supporting member so that it may be swung upwardly away from said switch point to permit access to the concave side of said reflector and to said radiation producing means.

4. In a railroad switch installation having an elongated stationary stock rail and an elongated switch point movably mounted so that it may be moved toward and away from said stock rail, the combination of an elongated tubular supporting member extending longitudinally of an in spaced relation to the switch point on the side thereof opposite the stock rail, means for supporting said elongated supporting member from said switch point for movement therewith, an elongated reflector having a concave surface capable of reflecting infrared radiation and two spaced marginal edges, said reflector being carried by said elongated supporting member with its concave surface facing said switch point and its marginal edges in close proximity to the side of said switch point opposite said stock rail, an elongated infrared radiation-producing source disposed at the concave side of said reflector to generate radiation which is reflected onto and heats said switch point, means for supplying energy to the said radiation source carried within said elongated tubular supporting member, and releasable clamp means pivotally mounting said reflector on said elongated supporting member so that it may be swung upwardly away from said switch point about the axis of said supporting member and clamped there to permit access to the concave side of said reflector and to said radiation source, said means supporting said elongated supporting member from said switch point protecting said reflector and said radiation source against shocks imparted to the switch point.

5. In a railroad switch installation having an elongated stationary stock rail and an elongated switch point movably mounted so it may be moved toward and away from said stock rail, the combination of an elongated reflector having a concave surface capable of reflecting infrared radiation and two spaced marginal edges, infrared radiation producing means disposed at the concave side of said reflector to generate radiation that is reflected by said reflector, and means for supporting said reflector and said infrared radiation producing means from said switch point on the side thereof opposite the stock rail, said means being adjustable to permit said reflector to be positioned so its concave surface faces said switch point and its marginal edges are in close proximity to the side of said switch point, and also to be positioned so its concave surface faces upwardly to permit access to said infrared radiation means and to the concave surface of said reflector, and means for supplying energy to said radiation producing means.

6. The apparatus of claim 5 in which said supporting means includes shock-absorbing means protecting said infrared radiation producing means and said reflector against shocks to which said switch point is subjected.

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