Aug. 8, 1961 J. STEMBERGER 2,995,210

RAIL LUBRICATOR DELIVERY AND APPLYING DEVICE

Filed July 1, 1958 4 Sheets-Sheet 1

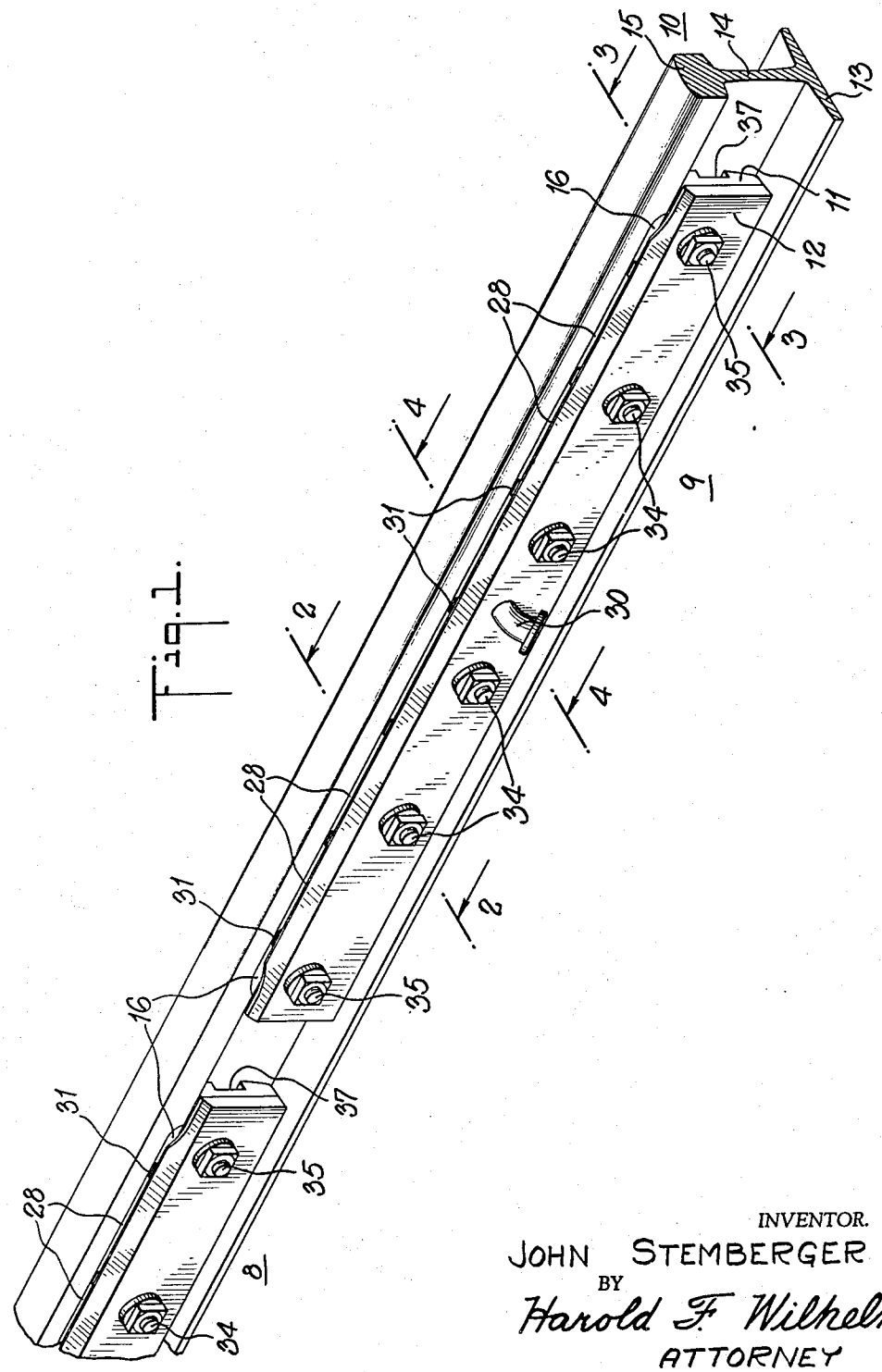


Fig. 1.

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Aug. 8, 1961 J. STEMBERGER 2,995,210

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Filed July 1, 1958 4 Sheets-Sheet 2

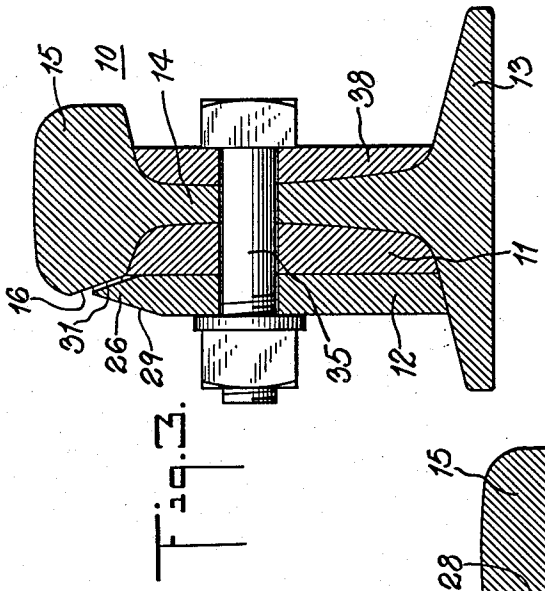


Fig. 3.

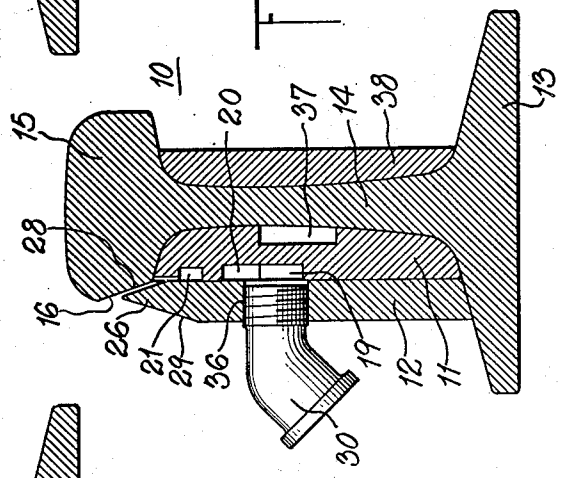


Fig. 4.

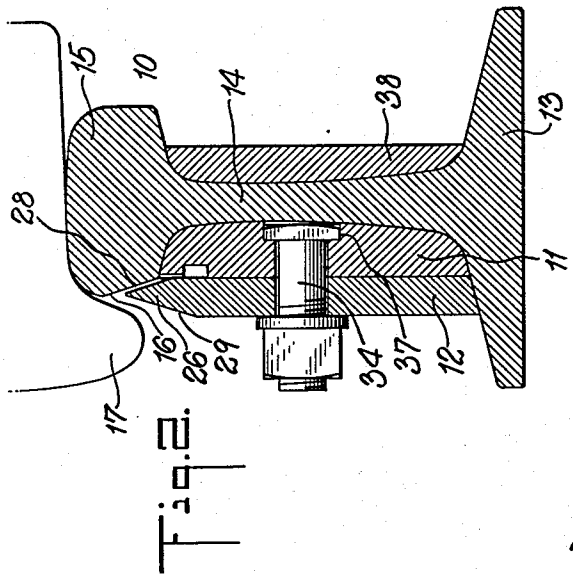


Fig. 2.

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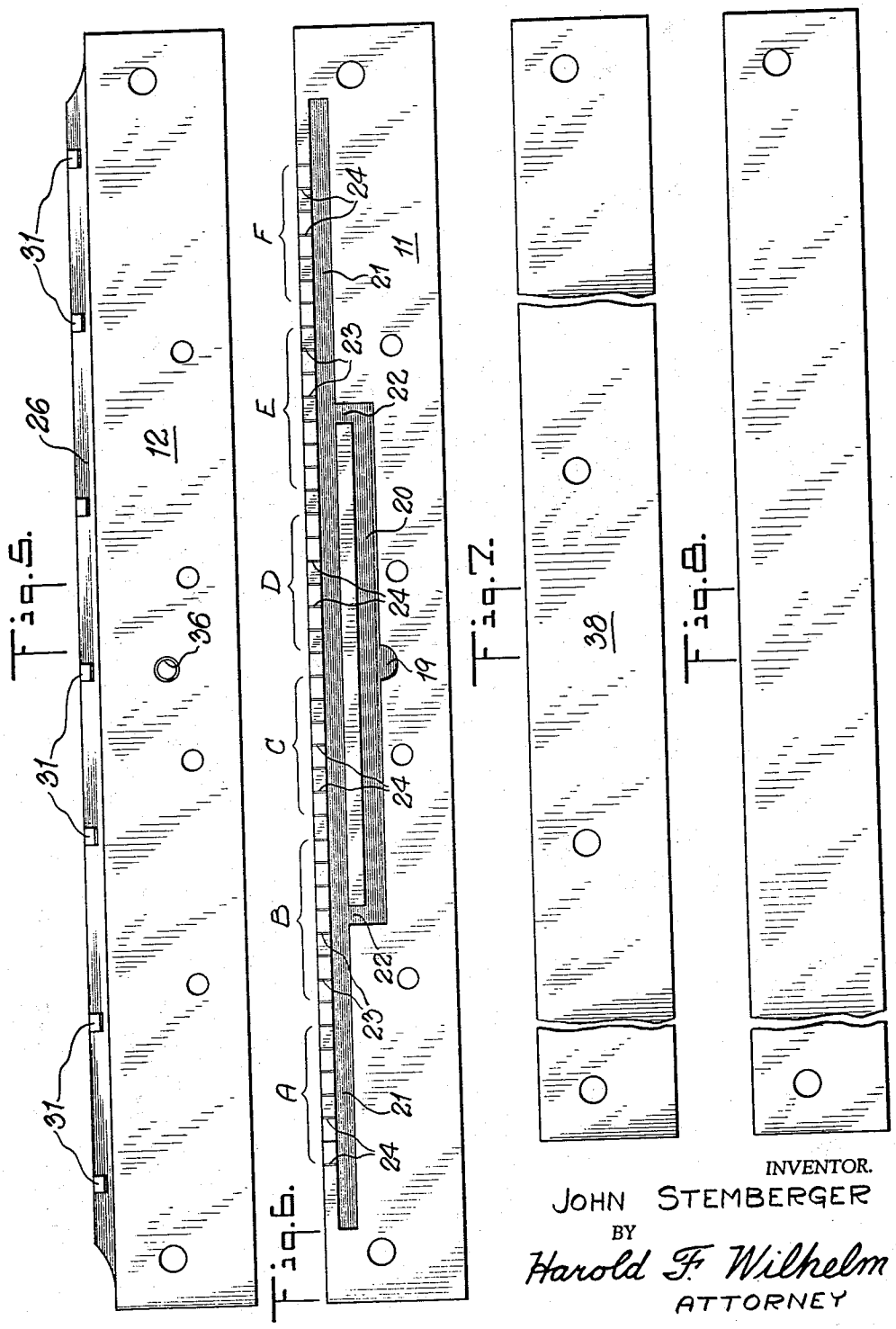
Aug. 8, 1961 J. STEMBERGER 2,995,210

RAIL LUBRICATOR DELIVERY AND APPLYING DEVICE

Filed July 1, 1958 4 Sheets-Sheet 3

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Aug. 8, 1961 J. STEMBERGER 2,995,210

RAIL LUBRICATOR DELIVERY AND APPLYING DEVICE

Filed July 1, 1958 4 Sheets-Sheet 4

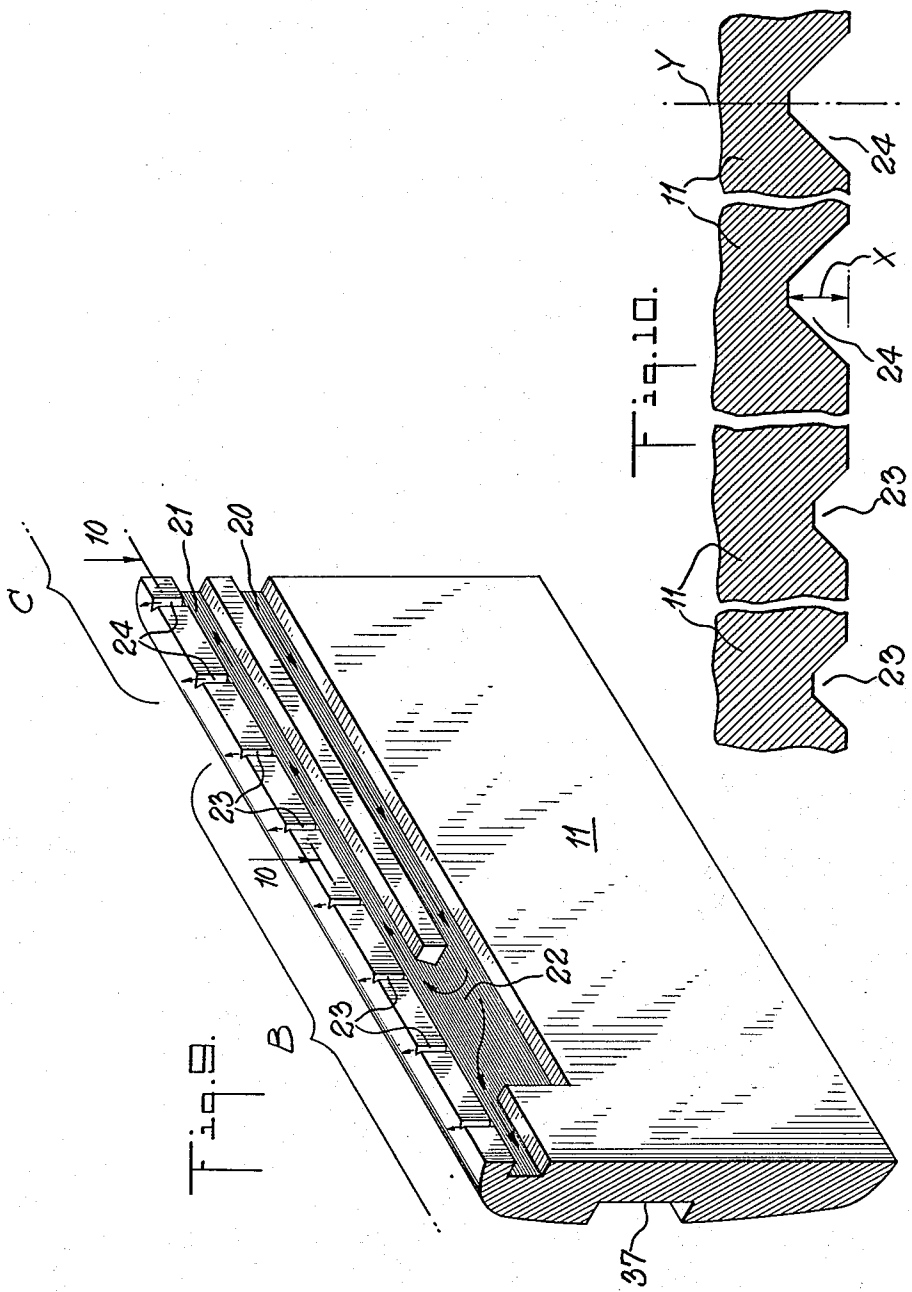


Fig. 9.




Fig. 10.

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2,995,210

# RAIL LUBRICATOR DELIVERY AND APPLYING DEVICE

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4 Claims. (Cl. 184—3)

The invention relates to lubricating devices for railway rails and more particularly of the type shown in Heidenthal Patent 2,185,810, dated January 2, 1940, although not limited to such use.

Rail lubricators of the Heidenthal type have been in commercial use for many years and have given generally satisfactory service. These devices comprise a wheel-operated ramp on the running rail driving a series of lubricant gear pumps located in the bottom of the lubricant reservoir alongside the track. The pumps feed lubricant to a lubricant delivery or applying device mounted on the gauge side of the running rail, which delivers lubricant to the wheel flanges in a long substantially continuous thin line.

The prior delivery device comprises essentially a series of lubricant chambers adjacent the rail web, which chambers deliver the lubricant through a substantially continuous longitudinal delivery slot formed between a bevel on the cut-away rail head and a delivery member bolted to the rail. Each pump feeds two adjacent lubricant chambers through an externally branched piping system. Each chamber is provided with a special equalizing rib to equalize the lubricant feed to its respective delivery slot.

Objects of the present invention are to improve the uniformity of lubricant feed to the delivery and applying slot, to reduce the amount of external branched piping, and in general, to simplify the lubricant feed to the delivery and applying devices.

According to a preferred form of the present invention, a delivery bar and delivery plate are bolted together and to the rail. The delivery bar is provided with a primary longitudinal groove to whose mid-point the pump delivers lubricant; the delivery bar is also provided with a pair of aligned secondary longitudinal grooves whose mid-points are connected by junctions to the ends of the primary groove.

Connecting with the secondary grooves at the top edge of the bar are two sets of special grooves of restricted cross section. Each set of special grooves comprises a center group of smaller cross section adjoining its particular junction, and end groups of larger cross section on either side. The delivery plate has an upper longitudinal rib with a beveled inner face which forms, with the bevel on the rail head, a deep accumulation and applying slot. This upper rib also has a beveled outer face to clear the wheel flange.

The several grooves are so shaped and proportioned that, when the pump is operated to force lubricant to the delivery device, the lubricant is squirted through the restricted orifices, formed by the restricted grooves and delivery plate, into the deep accumulation slot where the lubricant builds up and finally oozes out, and from which it is wiped off by the wheel flanges in a substantially continuous long thin line.

Other objects and features of the invention will be more apparent from the following description and claims when considered with the accompanying drawings in which:

FIG. 1 is a perspective of a running rail illustrating two delivery units, according to the invention, each delivery unit comprising a delivery plate and delivery bar;



FIG. 2 is a section on the line 2—2 of FIG. 1 taken through a short machine bolt;

FIG. 3 is a section on the line 3—3 of FIG. 1 taken through a long through bolt;

FIG. 4 is a section on the line 4—4 of FIG. 1 taken through a lubricant supply nipple;

FIG. 5 is a side elevation of the delivery plate looking at the face which contacts the delivery bar;

FIG. 6 is a side elevation of the delivery bar looking at the face which contacts the delivery plate;

FIG. 7 is an elevation of a single reinforcing strap used when two applying units are used, as illustrated in FIG. 1;

FIG. 8 is a side elevation of a reinforcing strap used when a single applying unit is used;

FIG. 9 is a perspective of a section of delivery bar illustrating the primary longitudinal groove, the secondary longitudinal grooves, and the restricted grooves; and

FIG. 10 is a fragmentary cross section taken on the line 10—10 of FIG. 9 illustrating the different size restricted grooves.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawings.

In the accompanying drawings and in the description forming part of this specification, certain specific disclosure of the invention is made for purposes of explanation, but it will be understood that the details may be modified in various respects without departure from the broad aspect of the invention.

Referring now to the drawings and more particularly to FIG. 1, two lubricant delivery or applying devices 8 and 9 are shown applied to running rail 10. The running rail is a standard T-rail having base 13, web 14 and head 15. The side of head 15 is cut away to form bevel 16. It will be understood that the number of delivery devices used depends upon the amount of lubricant it is desired to apply to the wheel flanges. Each applying device will be supplied with lubricant by its own single gear pump operated by suitable operating mechanism (not shown).

Since the lubricant applying devices 8 and 9 are identical, it is only necessary to describe one. Each lubricant applying device comprises, in general, a delivery or D-bar 11 and a delivery plate 12 suitably clamped together and to the running rail 10. The clamped plates provide branched distributing ducts (FIGS. 2 and 4) to deliver lubricant to a deep accumulating and applying slot 28; slot 28 is formed by a bevel on the delivery plate 12 and by the bevel 16 on rail head 15. The applying slot 28 applies lubricant to the flanges 17 of railway wheels, as indicated particularly in FIG. 2.

Referring now to FIGS. 6, 9 and 10, the delivery bar 11 has a longitudinal primary groove 20 having an enlarged mid-point 19. Bar 11 also has two longitudinal secondary grooves 21. The secondary grooves 21 are connected end-to-end to form a single groove, but may be considered, for purposes of explanation, as two separate grooves. The mid-point of each secondary groove 21 is connected to the end of the primary groove 20 by a junction groove 22.

Delivery bar 11 also has a number of vertical restricted slots 23 and 24 connecting secondary grooves 21 with space above the bar. When the delivery bar 11 and delivery plate 12 are clamped together, as illustrated in FIGS. 2 and 4, for example, these slots 23, 24 become, in effect, orifices which feed the deep applying slot 28.

It will be noted that primary groove 20 is both wider and deeper than secondary groove 21 and that secondary

groove 21 is deeper than restricted slots 23 and 24. The relation between the cross sections of these ducts will be discussed more at length below.

Referring also to FIG. 5, the delivery plate 12 has an upper rib 26 having an outer beveled surface 29 and an inner beveled surface forming, with the head bevel 16, the deep slot 28. Delivery plate 12 also has a series of spacers 31 welded thereto which engage the rail head 15 to prevent the applying slot 28 from being closed by pressure of wheel flanges 17. Plate 12 also has openings for the short bolts 34 and through bolts 35, and an opening 36 for feed nipple 30.

The delivery bar 11 has a longitudinal back slot 37 facing the rail web, which houses the square heads of the short bolts 34 to keep them from turning. In addition to the short bolts 34, through bolts 35 pass through the rail web 14 and through reinforcing strap 38 to clamp the entire assembly together.

It will be understood that a grease-tight seal between the delivery plate 12 and delivery bar 11 is obtained by having smooth meeting surfaces and applying a light coat of plastic sealing compound to the surfaces. This seal, together with the fact that the two plates are drawn together by a series of short bolts 34 and through bolts 35, prevents any leakage of grease forced through the several branched ducts.

The nipple 30 is fed with lubricant by a single pump (not shown) of the positive discharge gear type, such as disclosed in Heidenthal Patents 2,059,235 or 2,185,810. The operating mechanism (not shown) for driving the pump may be of the type shown in these patents; or, if desired, the operating mechanism for driving the pump may be of the type disclosed in copending application, Serial No. 729,735, filed April 21, 1958, in the name of Oscar F. Magnus, and assigned to the present assignee. The operating mechanism may be mounted on the track in any convenient or desirable location depending upon the particular operating mechanism and other requirements.

Since two applying devices 8 and 9 are illustrated, the reinforcing strap 38 of FIG. 7 is used, which extends substantially the entire length of the two units. In the event only one applying device is used, the shorter strap of FIG. 8 will be used, which extends substantially the length of only one unit.

Uniform distribution of lubricant along the deep delivery slot 28 depends upon the proportioning of the restricted orifices and the shapes and dimensions of the primary and secondary feed conduits and of the restricted orifices.

Referring to FIGS. 6, 9 and 10, the restricted orifices may be divided into groups indicated by A to F in FIG. 6. "Center" groups B and E adjoining junctions 22 are smaller in cross section; whereas "end" groups A and C, on the one hand, and D and F, on the other, remote from junctions 22, are of larger cross section. Center groups B and E each contain eight orifices and end groups A, C, D and F each contain seven orifices, making forty-four orifices in all. As shown particularly in FIGS. 9 and 10, the restricted orifices are tapered or wedge shape in cross section, the larger orifices 24 being deeper and wider than the smaller orifices 23.

It will be understood that the number of restricted orifices 23, 24, their actual cross section, and the number of different cross sections may be varied, and still obtain desirable results.

In practice, excellent results have been obtained using only two sizes of orifices and with the number and arrangement illustrated. The smaller restricted wedge-shape orifices 23 were made .027 inch deep while the larger restricted orifices 24 were made .037 inch deep, with corresponding difference in width. In each case depth was measured from the surface of the bar 11 to the bottom of the grooves as indicated by X in FIG. 10. The angle of the wedge was 45° with respect to the center line Y of the wedge. The orifices were about one inch apart, from center to center.

The cross sections of the several feed ducts are also important to obtaining uniform lubricant distribution along the length of the applying slot. Taking the cross section of the three-quarter inch nipple 30 as one hundred percent, in practice the cross sectional area of the primary groove 20 was taken at about thirty-four percent and since the lubricant moves in both directions from the mid-point, the total effective cross section of both branches of primary groove 20 is sixty-eight percent. The cross section of the secondary grooves 21 was reduced to about sixteen percent of the original nipple, and since the lubricant moves in two directions from each junction point 22, the total effective cross sectional areas of the four branches of the secondary grooves 21 amounted to sixty-four percent of the cross section of the feed nipple this is slightly less than the total effective cross section of the primary grooves 20.

The total effective cross sectional area of all forty-four restricted orifices of groups A to F amounted to about sixteen percent of the cross section of the nipple, or one-quarter of the total effective cross sectional area of the secondary grooves 21. This considerable reduction in area causes the lubricant to flow through the restricted orifices 23, 24 at a higher speed. It has been found that if the lubricant is not forced through these orifices quickly, the flow has a tendency to become sluggish and the distribution uneven.

The accumulating slot 28 is deliberately made deep so as to act as a sort of storage or accumulation space. This depth, together with the angularity between the orifices 23, 24 and the side of the rail head absorbs the squirts of lubricant from the restricted orifices 23, 24 and prevents them from squirting the lubricant too far where the lubricant can get on the wheel treads. The accumulation slot 28 thus retards or absorbs the squirts, preventing them from reaching the wheel treads and at the same time permits a certain longitudinal flow of lubricant, lengthwise of the rail, to equalize the feed along the length of the delivery slot. The lubricant oozes from the top of the slot 28 where it is picked up by the passing wheel flange 17 in a long thin line.

It will be understood that the velocity of flow of lubricant from the nipple 30 to the restricted orifices 23, 24 progressively increases, reaching a maximum velocity through the restricted orifices. Also, that the single gear type pump, which feeds the nipple with lubricant, is sufficiently large, and that the operating mechanism, which operates the pump, is sufficiently powerful to cause the desired velocity through the restricted orifices 23, 24. It will be understood that the operating mechanism, operated by the passage of car wheels, operates the pump intermittently so that the lubricant is delivered to nipple 30 in a series of pulses.

Thus a rail lubricant delivery applying device is provided which is simple in construction and reliable in operation. It distributes the lubricant evenly and uniformly along the longitudinal delivery and applying slot. The delivery device applies the lubricant in a long thin line to the wheel flanges without any danger of getting the lubricant on the wheel treads in spite of the squirting action of the restricted orifices. The invention also reduces the amount of external branch piping and minimizes need for machining the running rail.

While certain novel features of the invention have been disclosed herein, and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In a rail lubricator, a running T-rail, a delivery bar member adjacent the rail web, a delivery plate member fitting against said bar member and having an upper rib forming, with the rail head, a deep lubricant accumula-

tion and applying slot, the meeting surface of at least one of said members containing a primary longitudinal duct, a set of secondary longitudinal ducts above said primary duct, junction ducts at the ends of said primary duct, each junction duct connecting the primary duct with the mid-point of its respective secondary duct, a series of upright restricted orifice ducts connecting said secondary ducts with said accumulation slot, and feed means communicating with the mid-point of said primary duct.

2. In the rail lubricator of claim 1, a series of blocks located in said applying slot and spaced along the length thereof, said blocks being secured to a wall of said applying slot and acting to prevent car wheels from closing said slot.

3. In a rail lubricator, a running T-rail having a beveled surface at the under corner of its head, a D-bar adjacent the rail web and fitting the upper fillet of the rail, said D-bar having an upright face registering with the lower edge of said beveled surface, a delivery plate fitting against said D-bar and having an upper rib whose inner face carries a beveled surface to form, with said head beveled surface, a deep accumulation slot, said rib having a beveled outer surface to clear wheel flanges; said D-bar having a primary longitudinal groove, a set of aligned secondary



longitudinal grooves above said primary groove, junction grooves at the ends of said primary groove, each junction groove connecting the primary groove with the mid-point of its respective secondary groove, a series of upright restricted orifices connecting said secondary grooves with said accumulation slot, those restricted orifices near said junction grooves being of smaller cross section than those remote from said junction grooves; said delivery plate having a feed opening communicating with the mid-point of said primary groove.

4. In the rail lubricator of claim 3, said restricted orifices being tapered in cross section.

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