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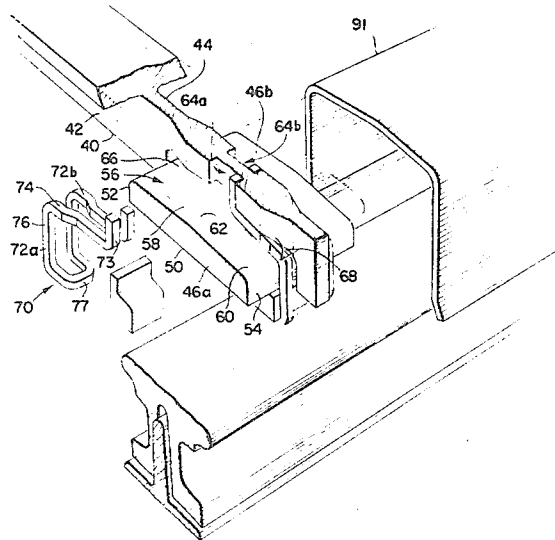
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[54] **SECURING MEANS FOR POWER RAIL AND/OR SHIELD**  
 8 Claims, 6 Drawing Figs.

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 [50] Field of Search..... 191/29, 30,  
 31, 32; 287/189.35; 138/149, 122

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**ABSTRACT:** Securing means for attaching a power rail to a support member. The support member is secured to the third rail by means of a pair of U-shaped clamps which grip opposite sides of a power rail flange and each are removably contained within grooves formed in the support member. Two protrusions disposed on opposite sides of the support member serve as guiding surfaces to attachment of the clamps to the support member and also, in one embodiment of the invention, support a power rail shield.



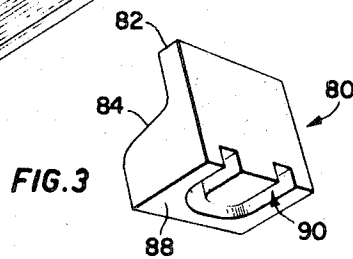
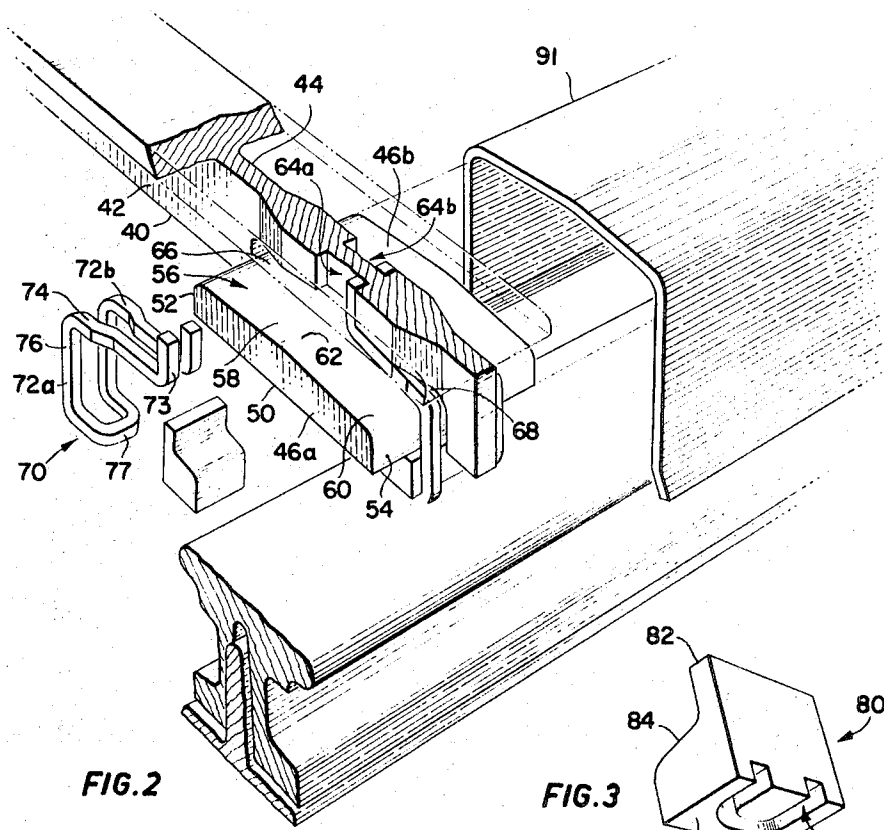
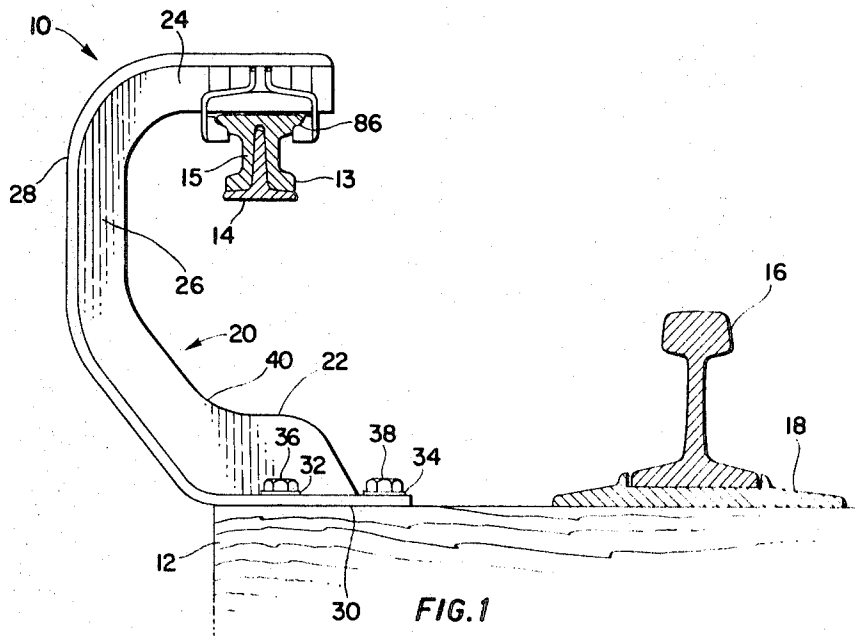


FIG. 2

FIG. 3

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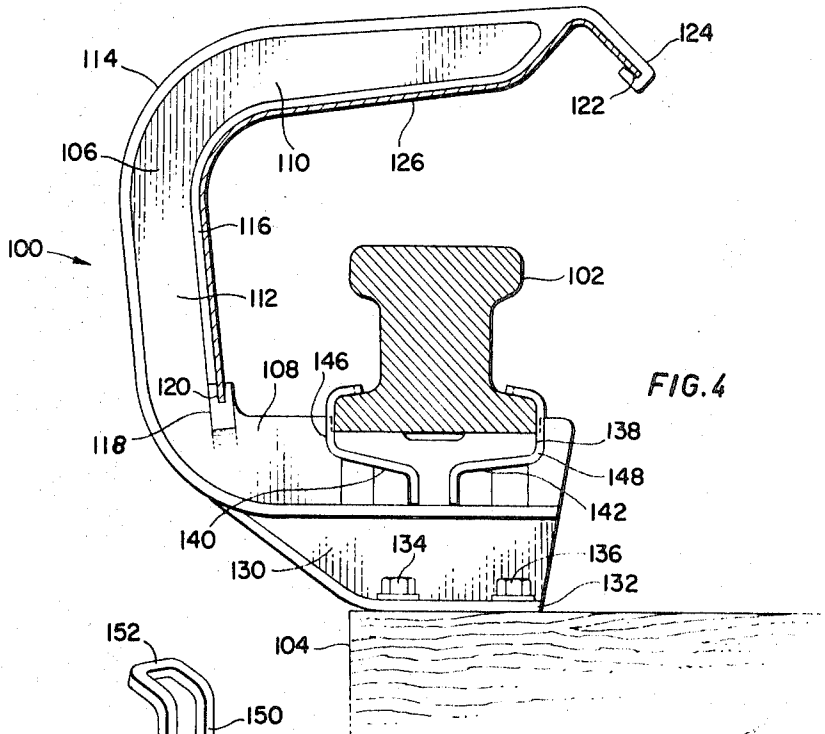


FIG. 4

FIG. 5

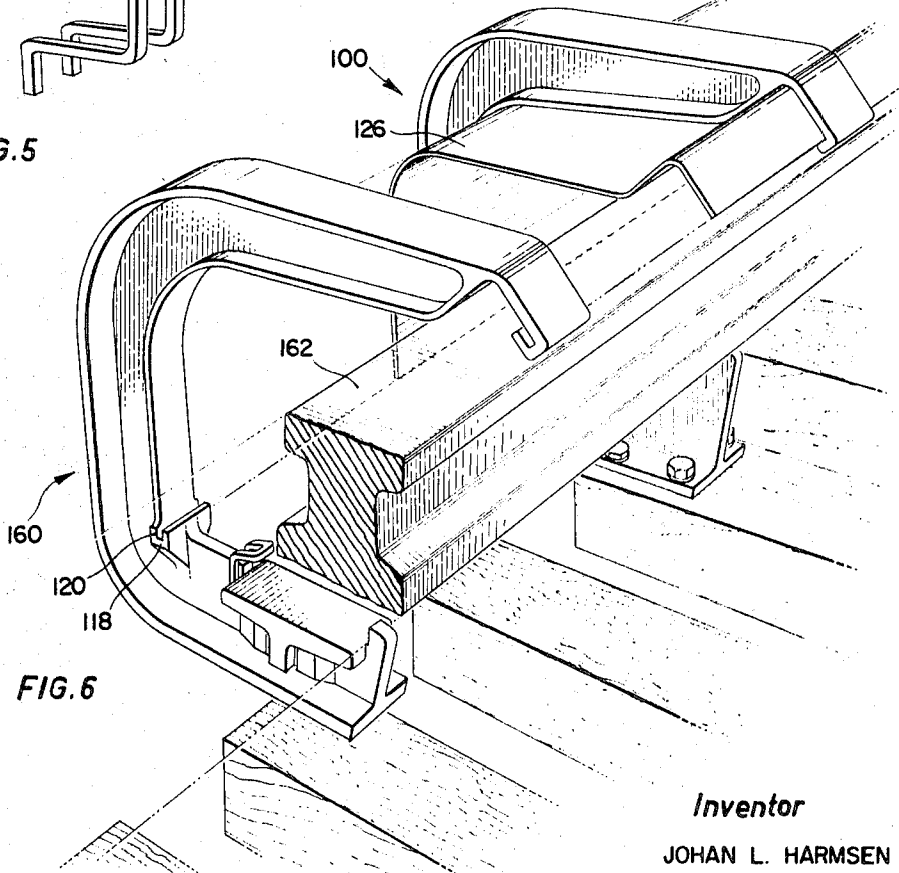
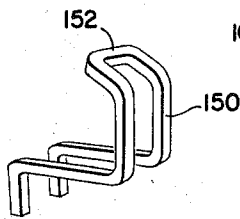


FIG. 6

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## SECURING MEANS FOR POWER RAIL AND/OR SHIELD

This invention relates to support members, adapted to carry power rails and/or shields for power rails. More particularly the invention is directed to support members which may be readily secured to power rails and shields for power rails.

Generally there are two types of power rails for use in conjunction with electrically powered trains: bottom contact power rails and top contact power rails. The takeoff arm or collector shoe of an electric train runs along the lowermost surface of a bottom contact power rail and runs along the uppermost surface of a top contact power rail.

A conventional support member for a bottom contact power rail consists of a metal bracket with a porcelain insulator held in rubber by a steel clamp at the top of the bracket. One side of the power rail is held in position by a bolt which passes through the insulator and the other side of the rail is held by a steel clamp which is bolted to the support member.

Such a support member has many disadvantages. Installation of the member is a laborious and time-consuming task. The labor cost of installation is therefore high. Porcelain is a good insulator but is brittle and breakage of insulators is a serious problem particularly since power rails are subject to severe vibration and occasionally to violent shocks.

Conventionally, top contact power rails are shielded by lengths of timber which are secured to the top and side of each support member by bolts. Projecting bolt heads are undesirable since they may constitute a dangerous obstruction and may become loose and eventually fall onto the power rail.

It is a principal object of the present invention to provide novel means for attaching a power rail to a support member. As a result of such means, the support member when in one position is adapted to support a bottom contact third rail and shield and when in a reverse position is adapted to carry a shield for a top contact power rail.

It is another object to provide a support member having means by which a power rail may be secured quickly and easily thereto without the need for bolts or nuts which can easily vibrate loose and disrupt service.

It is another object to provide a support member having novel means by which power rail may be secured thereto. Such means do not work loose when it is subjected to vibration or shock.

Another object is to provide a support member for a power rail shield which member may be quickly and easily clamped to a top contact power rail.

Another object is to provide a support member and shield formed of reinforced polyester or similar mouldable material. The support member may be quickly and easily assembled with a minimum of effort.

It is another object to provide novel means for supporting a power rail which is noncorrosive and flexible and requires infrequent maintenance.

Still another object is to provide a support member which is releasably clamped to a power rail in which carries a power rail.

These and other objects are accomplished by providing a support member adapted to be secured to a power rail, said support member having two lateral surfaces forming the side boundaries thereof, a pair of protrusions, one of which extending outwardly from each said lateral surface, the protrusions each having a surface adapted to contact a power rail, a side surface at each side thereof extending from the rail contacting surface to a second surface, each lateral surface having a groove formed therein, said groove commencing at a point spaced from said second surface extending to said second surface, dividing into two branches, said branches extending in opposite directions and each terminating at one said side surface, said grooves adapted to removably retain a pair of resilient clamps therein for securing said third rail to said support member.

A fuller understanding may be had by referring to the following description of a preferred embodiment of the present invention taken in conjunction with the accompanying drawings in which:

FIG. 1 is a side elevation of the support member according to the invention shown bolted to a rail tie and fastened to a power rail;

FIG. 2 is an exploded perspective view partly cut away, of the support member, power rail and shield;

FIG. 3 is a perspective view of an insert which contacts the lower surface of the power rail flange;

FIG. 4 is a side elevation of a second embodiment of the support member shown bolted to a rail tie and fastened to a power rail;

FIG. 5 is a perspective view of a clamp which secures a power rail to the support member;

FIG. 6 is a perspective view of second and third embodiments of the support member shown in conjunction with rail ties, a power rail and power rail shield.

Like reference characters refer to like parts throughout the description of the drawings.

With reference to FIG. 1, the invention is shown incorporated in support member generally indicated 10. Support member 10 is shown secured to a railway cross-tie 12 and a power or third rail 13 is shown secured thereto. A train supporting rail 16 is shown seated on base 18 which is also secured to cross-tie 12.

Power rail 13 is of a two component type having a steel contact plate 14 along which the collector shoe of a train runs and a highly conductive aluminum element 15. The support member according to the invention may equally well be used in conjunction with a single component rail.

Member 10 includes a web indicated generally 20 having a pair of opposed first and second limbs 22 and 24 respectively spaced apart by an intermediate portion 26. A flange 28 extends along the length of limb 22, intermediate portion 26 and limb 24 and defines the outer wall of member 10. The flange is disposed generally normal to the plane containing web 20 and extends outwardly from both sides thereof. The portion of flange 28 which extends along the length of limb 22 has a face 30 which contacts the upper surface of tie 12. A plurality of apertures are formed in the flange for the admission of bolts. Two such apertures are indicated 32 and 34. Bolts 36 and 38 pass through apertures 32 and 34 respectively and into cross-tie 12. The support member is in the form of a cantilever and may be secured to a cross-tie of standard length.

With reference to FIG. 2, web 20 has an inner wall 40 which extends along the length of limb 22, intermediate portion 26 and limb 24 and which defines the inner face of member 10. Walls 42 and 44 define the sidewalls of the support member and extend from the side edges of inner wall 40 to flange 28.

A pair of elongated protrusions 46a and 46b extend outwardly from each sidewall 42 and 44 respectively of second limb 24.

Protrusions 46a and 46b have the same structure and for the sake of simplicity like parts of the protrusions will be identified by the same numeral except where it is necessary to distinguish one from another in which case the parts of protrusion 46a will be given the designation *a* and protrusion 46b the designation *b*.

Each protrusion has a surface 50 which is adapted to contact the power rail. Surface 50 is preferably flat and coplanar with inner wall 40 of limb 24. Side surfaces 52 and 54 extend upwardly from the side edges of rail contacting surface 50 to an upper surface generally, 56. Surface 56 is composed of two segments 58 and 60 which commence at side surfaces 52 and 54 respectively and converge upwardly and terminate at apex 62.

A groove 64a is formed in side wall 42 of limb 24. The groove commences above wall 56a, extends downwardly to wall 56a where it divides into two segments, 66 and 68 which extend in opposite directions to side surfaces 52a and 54a respectively. Similarly a groove 64b is formed in sidewall 44 which groove downwardly to wall 56b, divides, one branch extending to side surface 52b and the other to side surface 54b.

The thickness of web 42 begins to increase above side surfaces 52 and 54 and reaches a maximum about grooves 64a and *b*. Grooves 66 and 68 have a generally rectangular cross

section throughout their lengths and terminate in those areas of the web of lessening thickness.

A clamp indicated generally 70 is adapted to be removably contained in each groove. Clamp 70 has a uniform preferably rectangular cross section throughout its length and is formed of resilient material, preferably spring steel. The clamp is composed of two spaced-apart limbs 72 of identical structure. Where it is necessary to distinguish between the two limbs, the elements of one limb are given the designation *a* and the elements of the other *b*. Each limb has an upstanding terminal portion 73, a lateral portion 74 and a medial portion 76 and the limbs are joined by an intermediate generally U-shaped portion 77. Portions 73*a* and 74*a* of the limb are adapted to be received in grooves 64*a* and 66*a*. When so received, terminal portion 73*a* will contact the sidewall of groove 64*a* and portion 74*a* will be accommodated within groove 66. Similarly portions 73*b* and 74*b* are adapted to be received in grooves 64*b* and 66*b*.

With reference to FIG. 3, an insert 80 is illustrated. The insert has an upper surface 82, adapted to contact surface 50 of the protrusion, an intermediate surface 84 which contacts the flange 86 of power rail 14 and a lower surface 88 having a generally U-shaped recess 90 in which intermediate portion 77 of a clamp is accommodated.

Protrusions 46*a* and *b* serve to provide a guiding surface for mounting clamp 70 and also serve to maintain the clamp in a position of supporting the power rail. The clamp is shaped in such a way that intermediate portion 77 provides support to the power rail flanges 86. The clamp is supported sideways by the vertical sidewall 52 of the protrusions and is anchored in groove 64. When the clamp is in an unstressed or undeformed state, the distance between terminal portions 73*a* and 73*b* is approximately equal to the thickness of the web at grooves 64*a* and 64*b*.

Power rail 13 is secured to support member 10 as follows: Flange 86 of the power rail is brought into contact with lower surfaces 50 of the protrusions. The intermediate portion 77 of a clamp is then placed in groove 90 of an insert 80. The clamp and insert are pushed horizontally sideways onto protrusions 46 from side surfaces 52 so that surface 84 of the insert contacts the lower wall of the power rail flange and the lateral portions 74 of the clamp contact surfaces 56*a* and *b*. As the clamp moves inward, terminal portions 73*a* and *b* spread apart since the thickness of the web increases. When terminal portions 73*a* and *b* reach grooves 64*a* and *b*, they spring toward each other and the clamp is maintained firmly engaged to the protrusions and the clamp is prevented from moving horizontally outward. The terminal portions 73 of the clamp within grooves 64*a* and *b* serve to anchor the clamp so that it is prevented from moving horizontally outward.

Clamp 70 may be removed by forcefully spreading lateral portions 74*a* and *b* apart and applying a horizontal outwardly directed force to remove terminal portions 73*a* and *b* from grooves 64*a* and *b*.

As illustrated, protrusions 46*b* serve as a support for one end of power rail shield 91. Shield 91 is generally U-shaped and extends between adjacent support members and its ends rest upon protrusions which face one another. The shield does not make contact with the power rail but serves to protect the power rail from rain, snow and freezing rain.

With reference to FIG. 4, a second embodiment of the present invention is illustrated wherein the manner in which the power rail is secured to the support member is the same as that described before except that the power rail is seated upon a pair of protrusions as contrasted to suspended from a pair of protrusions, as illustrated in FIGS. 1 and 2.

A support member, generally 100 for a top contact power rail 102 is secured to a rail tie 104. Member 100 includes a web 106 having a pair of opposed first and second limbs 110 and 108 interconnected by intermediate portion 112.

A flange 114 extends along the length of the outer edge of web 106. An inner flange 116 commences at support block 118 at the lower end of intermediate portion 112 and extends

upwardly along the length of the inner edge of the web and terminates at retaining member 124 formed at the free end of limb 110.

A groove 120 is formed in support block 118, and a second groove 122 is formed in retaining member 124. The longitudinal axes of grooves 122 and 120 are parallel to one another and to the longitudinal axis of power rail 102. A shield 126 is adapted to be retained within grooves 120 and 122. Shield 126 has a shape which conforms generally to the configuration of inner flange 116 and the inner surface of retaining member 124 and has lower and upper edges adapted to be retained within grooves 120 and 122 respectively. Preferably when the lower edge is seated in groove 120, upwardly directed force will be necessary to move the upper edge of the shield into groove 122.

A base 130 is secured to limb 108 and extends downwardly therefrom to tie 104. A flange 132 extends along the lower edge of the base and a plurality of apertures are formed therein for receipt of bolts 134 and 136 which serve to connect the base to the rail tie.

A pair of protrusions (one of which illustrated and indicated 138) project outwardly from the plane of limb 108 and grooves 140 and 142 are formed in the limb for receipt of clamp 146 and 148 which serve to secure the power rail to the support member. The structure of the protrusions and clamps and the means by which the clamps are secured to the protrusions are the same as that described above except that the length of portion 150 of the clamp (shown in FIG. 5) is somewhat shorter than medial portion 76 of clamp 70 since intermediate portion 152 of the clamp makes direct contact with the rail flange. There is no insert between portion 152 and the rail flange. An insert may of course be made use of in the embodiment illustrated in FIG. 4 and an insert may be dispensed within the embodiments of FIGS. 1 and 2 where appropriate alterations are made to the dimensions of the clamps.

With reference to FIG. 6, support member 100 is shown in conjunction with a support member 160. Support member 160 is identical in all respects with member 100 except that member 160 has no base corresponding to base 130 and makes no contact with the rail ties. Support member 160 is secured to power rail 162 and serves to maintain shield 126 in a fixed position above the power rail. The power rail may be maintained in position by conventional support members or by members such as support member 100.

Preferably support members 10, 100 and 160 and shield 91 and 126 are formed from fiber-glass reinforced polyester or similar moldable material. Such material has a high physical strength, satisfactory insulating characteristics and is relatively modest of cost. The material can be readily molded to a desired shape and may be significantly thinner than wood having comparable strength. A molded section of reinforced polyester serves the same function as the conventional rail shield composed of two separate wooden boards.

The embodiment of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A support member adapted to be secured to a power rail, said support member having two lateral surfaces forming the side boundaries thereof, a protrusion extending outwardly from each said lateral surface, each said protrusion having a first surface adapted to contact said power rail, and a second surface spaced apart from said first surface, each lateral surface of said support member having a groove formed therein, said groove having a first portion extending parallel to the second surface of said protrusion and being defined, in part by a surface coplanar with said protrusion second surface, said groove further having a second portion commencing at said first portion and extending away therefrom, said grooves adapted to removably retain a pair of resilient clamps therein for securing said power rail to said support member.

2. In combination with the support member as claimed in claim 1, a clamp composed of two spaced-apart limbs joined by an intermediate portion, each limb adapted to be releasably

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secured in the groove formed in each lateral surface of said support member and when so secured, said intermediate portion secures one side of the power rail to the support member.

3. The combination as claimed in claim 2 wherein said support member includes first and second limbs spaced apart by an intermediate portion, said pair of protrusions extending outwardly from said second limb, said support member including means for securing a power rail shield to said support member.

4. The combination as claimed in claim 3 further including a power rail shield having a lower and upper edge, a support block secured to the intermediate portion of said support member and having a groove formed therein, and a retaining member extending outwardly from the free end of said first limb and having a groove formed therein, both said grooves being disposed normal to the plane of the web, the lower edge of said shield adapted to be retained in said support block groove and said upper edge adapted to be retained in said retaining member groove.

5. The support member as claimed in claim 1 wherein said support member includes first and second limbs spaced apart by an intermediate portion, said first limb having a face adapted to contact a rail tie, said pair of protrusions extending outwardly from opposite sides of said second limb, said support member including means for attachment to a rail tie.

6. The support member as claimed in claim 5 wherein said support member further includes a flange which defines the outer wall of said web and which extends outwardly from the plane of said web, that portion of said flange which extends outwardly from said first limb having a plurality of holes formed therein, said means for attachment to a rail tie comprising fastening means adapted to pass through said holes.

7. In combination, a power rail having a surface adapted to

be contacted by a takeoff arm and having an upper flange; a support member including a web having a pair of spaced apart first and second limbs, each limb having a free end and interconnected at the opposite end by an intermediate portion, said web being defined in part by an inner wall extending along the lengths of said intermediate portion and said limbs and a pair of sidewalls, said first limb having a face adapted to contact a rail tie, said second limb having a protrusion, extending outwardly from each said sidewall, said protrusions each having a first surface adapted to contact said power rail, and a second surface spaced apart from said first surface, said second limb of said support member further having a groove formed in each sidewall thereof, said groove having a first portion extending parallel to the second surface of said protrusion and being defined, in part, by a surface coplanar with said protrusion second surface, said groove further having a second portion commencing at said first portion and extending away therefrom, a pair of clamps each having a pair of opposed parallel limbs spaced apart by an intermediate portion and a terminal portion extending from one said parallel portion, said terminal portion and the parallel portion extending therefrom adapted to be contained within one said groove and the other parallel portion spaced apart from said protrusion lower surface; an insert adapted to be positioned in the space between said protrusion power rail contacting surface and said parallel portion and having a surface adapted to contact said power rail flange and maintain said power rail in contact with said support member.

8. The combination as claimed in claim 7 further including a generally U-shaped shield adapted to extend between adjacent support members and having edges adapted to rest upon the second surfaces of said protrusions.

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